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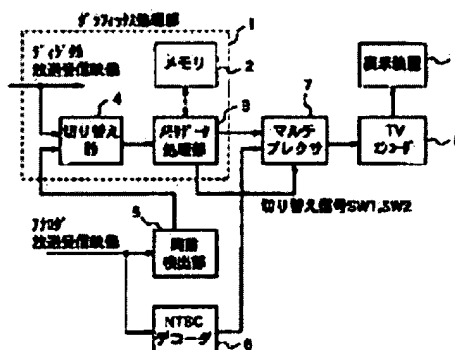
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(54) VIDEO IMAGE COMPOSITING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an image compositing device that uses only one graphics processing section so as to generate a graphics image signal or a signal on which graphics image information is superimposed and composites the signal with a video signal independently of whether the video signal selected among a plurality of video signals is an analog signal or a digital signal.

SOLUTION: A graphics processing section 1 that receives a digital broadcast reception video image to composite graphics images, generates a graphics image of an analog broadcast reception video image, generates a switching signal to composite the graphics images, allows a multiplexer 7 to composite the images by using the switching signal to obtain the video signal resulting from compositing the graphics image onto the analog broadcast reception video image. Furthermore, the graphics image information is superimposed for an invalid display period of the video signal to select the composite of the graphics images.



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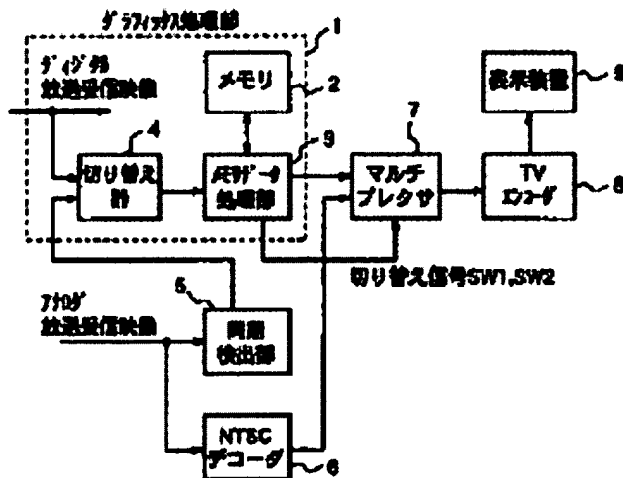
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Abstract:

PROBLEM TO BE SOLVED: To obtain an image compositing device that uses only one graphics processing section so as to generate a graphics image signal or a signal on which graphics image information is superimposed and composites the signal with a video signal independently of whether the video signal selected among a plurality of video signals is an analog signal or a digital signal. **SOLUTION:** A graphics processing section 1 that receives a digital broadcast reception video image to composite graphics images, generates a graphics image of an analog broadcast reception video image, generates a switching signal to composite the graphics images, allows a multiplexer 7 to composite the images by using the switching signal to obtain the video signal resulting from compositing the graphics image onto the analog broadcast reception video image. Furthermore, the graphics image information is superimposed for an invalid display period of the video signal to select the composite of the graphics images.

**JPO Machine translation abstract:****(57) Abstract**

SUBJECT One graphics operation part aims at generating the graphics screen of one video signal chosen from two or more video signals.

Means for Solution The graphics operation part 1 which compounds a graphics screen by considering a digital-broadcasting received image as an input generates a graphic screen of an analog broadcasting received image, and. A video signal with which a graphics screen was compounded by analog broadcasting received image is obtained by generating a switch signal for graphics screen composition, and compounding by the multiplexer 7 using the switch signal. It enables it to choose composition of a graphics screen by superimposing graphics screen information on an un-effective display period of a video signal.

Claim(s)

Claim 1 While inputting the 1st video signal, and compounding a graphics screen signal to this or generating a graphics screen signal of the 2nd image, A graphics operation means to output a graphics switch signal which directs a change of this graphics screen signal, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from this 2nd video signal, A synchronized signal of the 1st video signal and a detection synchronized signal of the 2nd video signal that the above-mentioned synchronous detection means detects are inputted, A synchronized signal switching means which outputs one synchronized signal, and a signal or a graphics screen signal with which it was superimposed on graphics screen information from the above-mentioned graphics operation means, A graphics switch signal from the above-mentioned graphics operation means, A signal or a graphics screen signal which inputted the 2nd video signal of the above and with which it was superimposed on the above-mentioned graphics screen information, An image compositing device provided with a multiplexer means to compound the 2nd video signal of the above with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

Claim 2 While inputting the 1st video signal, and compounding a graphics screen signal to this or generating a graphics screen signal of the 2nd image, A graphics operation means to output a graphics switch signal which directs a change of this graphics screen signal, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from this 2nd video signal, A synchronized signal of the 1st video signal and a detection synchronized signal of the 2nd video signal that the above-mentioned synchronous detection means detects are inputted, A synchronized signal switching means which outputs one synchronized signal, and a signal or a graphics screen signal with which it was superimposed on graphics screen information from the above-mentioned graphics operation means, A graphics switch signal from the above-mentioned graphics operation means, A signal or a graphics screen signal which inputted the 2nd video signal of the above and with which it was superimposed on the above-mentioned graphics screen information, An image compositing device provided with a multiplexer means to compound the 2nd video signal of the above with a digital signal by a multiplexer using the above-mentioned graphics switch signal.

Claim 3 While inputting the 1st video signal, and compounding a graphics screen signal to this or generating a graphics screen signal of the 2nd image, A graphics operation means to output a graphics switch signal which directs a change of this graphics screen signal, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A synchronized signal switching means which outputs one synchronized signal, and the 2nd video signal, A scaling means to input a detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform expanding processing of an image, or a reducing process, A signal or a graphics screen signal with which it was superimposed on graphics screen information from the above-mentioned graphics operation means, The 2nd video signal by which scaling was carried out from the above-mentioned scaling means is inputted, A multiplexer means to compound a signal or a graphics screen signal with which it was superimposed on the above-mentioned graphics screen information, and the 2nd video signal by which scaling was carried out **above-mentioned** with an analog signal by a multiplexer using the above-mentioned graphics switch signal, An image compositing device characterized by preparation *****.

Claim 4 An image compositing device comprising:

A graphics operation means to output a graphics switch signal which directs a change of this graphics screen signal while inputting the 1st video signal, and compounding a graphics screen signal to this or generating a graphics screen signal of the 2nd image.

A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal.

A synchronized signal of the 1st video signal.

A detection synchronized signal of the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A synchronized signal switching means which outputs one synchronized signal, and the 2nd video signal, A scaling means to input a detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform expanding processing of an image, or a reducing process, A signal or a graphics screen signal with which it was superimposed on graphics screen information from the above-mentioned graphics operation means, The 2nd video signal by which scaling was carried out from the above-mentioned scaling means is inputted, A multiplexer means to compound a signal or a graphics screen signal with which it was superimposed on the above-mentioned graphics screen information, and the 2nd video signal by which scaling was carried out **above-mentioned** with a digital signal by a multiplexer using the above-mentioned graphics switch signal.

Claim 5 In inputting the 1st video signal, and compounding a graphics screen signal to this or generating a graphics screen signal of the 2nd image, With a condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen. If it is shown that a graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, While not generating a graphics screen signal of the 2nd image, A graphics operation means to output a graphics switch signal which directs a change of this graphics screen signal, A

synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from this 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A synchronized signal switching means which outputs one synchronized signal, and a signal or a graphics screen signal with which it was superimposed on graphics screen information from the above-mentioned graphics operation means, A signal or a graphics screen signal which inputted the 2nd video signal of the above and with which it was superimposed on the above-mentioned graphics screen information, and the 2nd video signal of the above, An image compositing device provided with a multiplexer means to compound with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

Claim 6 An image compositing device comprising:

In inputting the 1st video signal, and compounding a graphics screen signal to this or generating a graphics screen signal of the 2nd image, With a condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen. If it is shown that a graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, A graphics operation means to output a graphics switch signal which directs a change of this graphics screen signal while not generating a graphics screen signal of the 2nd image. A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from this 2nd video signal.

A synchronized signal of the 1st video signal.

A detection synchronized signal of the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A synchronized signal switching means which outputs one synchronized signal, and a signal or a graphics screen signal with which it was superimposed on graphics screen information from the above-mentioned graphics operation means, A multiplexer means to compound a signal or a graphics screen signal which inputted the 2nd video signal of the above and with which it was superimposed on the above-mentioned graphics screen information, and the 2nd video signal of the above with a digital signal by a multiplexer using the above-mentioned graphics switch signal.

Claim 7 In the image compositing device according to any one of claims 1 to 6, the above-mentioned graphics operation means, A scaling information recording device for performing expansion or reduction of pictures other than a significant figure section about significant figures, such as a character in a graphics screen, and a sign, An image compositing device having a graphics scaling means to perform expansion or reduction of the above-mentioned graphics screen using scaling information of the above-mentioned scaling information recording device.

Claim 8 A graphics screen information creating means which generates graphics screen information superimposed on a non-usual picture area field of a video signal, If a difference of time described in the part and time which a display or VTR has is less than constant value when the above-mentioned graphics screen information exists in a non-usual picture area field of the above-mentioned video signal, An image compositing device provided with a graphics screen reproduction means which superimposes a graphics screen signal based on graphics screen information in a usual picture area field.

Claim 9 In the image compositing device according to claim 8, from a transport stream (it is described as TS below) of digital broadcasting. While taking out a program and a transport stream packet (it is described as TSP below) on which program information was recorded which are viewed, listened to which or recorded, Fixed-length or variable-length number information which shows the number of TSP to cancel or the number of TSP which is not canceled is added to the TSP to take out, Graphics screen information which a TSP filter means which outputs changed TS, and the above-mentioned graphics screen information creating means generate, While inserting in a TSP position canceled in TS changed from the above-mentioned TSP filter means, The above-mentioned number information is corrected to a number value of TSP which inserted the above-mentioned graphics screen information, Changed TS which a TSP inserting means outputted as changed TS, and the above-mentioned TSP filter means or a TSP inserting means generates is inputted, . From number information of the changed TS, only the number generated invalid TSP filled up with stuffing bytes, transposed these invalid TSP to a field to which number information is

recorded, and were generated by TS reproduction means which carries out regeneration of TS, and the above-mentioned TSP inserting means. An image compositing device having taken out TSP in which graphics screen information was stored from changed TS, and having a TSP extraction means to reproduce graphic information.

Claim 10In the image compositing device according to claim 1, the above-mentioned multiplexer means by analog luminance signal Y, analog color difference signal R-Y, and analog color difference signal B-Y. Or an image compositing device characterized by what is performed with an analog R signal, an analog G signal, and an analog B signal.

Claim 11An image compositing device characterized by what an enable signal which shows whether the above-mentioned graphics operation means is an effective area of a graphics screen of the 2nd image is outputted for in the image compositing device according to any one of claims 1 to 7.

Detailed Description of the Invention

0001

Field of the InventionAbout an image compositing device, especially this invention generates a graphics screen signal, and relates to a video signal and the image compositing device to compound.

0002

Description of the Prior ArtThe mixing process of a video signal and the graphics signal is carried out, and the lineblock diagram of the conventional image compositing device displayed on a Television Sub-Division television on a plane is shown in drawing 30. Drawing 30 is a block diagram of the subscriber cable box apparatus which exists within the enclosure of the member to whom interactive mode video processing is given indicated to the "video graphics device for televisions" of JP,H9-163259,A.

0003RF baseband converter 920 in a subscriber cable box apparatus, RF Television Sub-Division channel signaling is received, and the baseband composition video output signal 924 which changed this RF Television Sub-Division channel signaling into baseband frequency from that multiplexed channel frequency, and was acquired by changing is outputted.

0004The converter control system 922 lets the cable 927 pass from this central office towards the central office of a remote cable company, Permission and an access control signal are received and/or transmitted, baseband video scrambling or descrambling is operated, and a message is made on a screen display (OSD). In order that the converter control system 922 may choose required channel programming, It lets the bus 929 pass and a control signal is outputted to RF baseband converter 920, it lets the leads 931 and 933 pass to the serial interface processor 930, and various control signals and decipherment data signals are outputted to it.

0005It is programmable to CPU936, for example, ROM934 is EPROM. RAM935 is used as scratch-pad memory for CPU936. The graphics memory 938 is a memory which memorizes the sprite data about graphics and a video picture.

0006From the bus 924, the decoding device 944 to a YUV circuit receives a baseband synthetic video video signal, and outputs the YUV video signal acquired as a result to the memory controller and the sprite state machine 942 on the bus 943.

0007It let the data bus 939 pass, and connected with the graphics memory 938, and the memory controller and the sprite state machine 942 are connected to the video processing circuit 946 by the data bus 945. A memory controller and the sprite state machine 942 access the table of the graphics memory 938 in the order defined beforehand, in order to assemble and display each graphics beyond one or it on the position in the horizontal scanning line on the screen of a television receiver defined beforehand.

0008The video processing circuit 946 lets the data bus 945 pass, receives the video signal from a memory controller and the sprite state machine 942, and outputs NTSC or a PAL standard video signal to a remote television receiver (not shown).

0009

Problem(s) to be Solved by the InventionHowever, the image compositing device which is a video graphics device for televisions shown in the above-mentioned conventional example has the

composition by which a graphics screen is compounded only to one kind of video signal, and such a device has the following SUBJECT points.

1) One video signal is chosen from two or more video signals, and it does not have the composition which compounds a graphics screen to the selected video signal.

2) When the kinds of two or more above-mentioned video signals differ especially, one is a video signal by digital-broadcasting reception, for example, When another is the analog video signal reproduced with analog VTR, in the device 999 which combined the conventional device like drawing 31, digital composition of the graphics screen for digital-broadcasting received images is carried out, for example, but. An analog video signal will be compounded in the graphics operation part which the VTR part had conventionally. Two graphics operation parts will exist as the whole device, and this will cause a cost hike. The images of two graphics screens differ and it also becomes giving a televiewer sense of incongruity.

0010Therefore, in the image compositing device in such a case, The selected video signal regardless of the kind whether to be an analog or to be digital, to one video signal chosen from two or more video signals only in one graphics operation part. A graphics screen signal or the signal with which it was superimposed on graphics screen information is generated, and to compound with a video signal is demanded.

0011Then, this invention is only one graphics operation part regardless of whether that selected video signal is an analog to one video signal chosen from two or more video signals, or it is digital, A graphics screen signal or the signal with which it was superimposed on graphics screen information is generated, and it aims at providing the image compositing device which can compound this with a video signal.

0012

Means for Solving the ProblemIn order to solve this SUBJECT, an invention concerning Claim 1 of this invention, While inputting the 1st video signal, and compounding a graphics screen signal to this or generating a graphics screen signal of the 2nd image, A graphics operation means to output a graphics switch signal which directs a change of this graphics screen signal, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and a graphics screen signal from the above-mentioned graphics operation means, A graphics switch signal from the above-mentioned graphics operation means, The 2nd video signal of the above is inputted and it is considered as an image compositing device which has a multiplexer means to compound the above-mentioned graphics screen signal and the 2nd video signal of the above with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

0013A graphics operation means which an invention concerning Claim 2 of this invention inputs the 1st video signal, and a graphics screen signal is compounded, or can generate a graphics screen signal of the 2nd image, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and a graphics screen signal from the above-mentioned graphics operation means, A graphics switch signal from the above-mentioned graphics operation means, The 2nd video signal of the above is inputted and it is considered as an image compositing device which has a multiplexer means to compound the above-mentioned graphics screen signal and the 2nd video signal of the above with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

0014A graphics operation means which an invention concerning Claim 3 of this invention inputs the 1st video signal, and a graphics screen signal is compounded, or can generate a graphics screen signal of the 2nd image, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input a detection synchronized signal which the above-mentioned synchronous detection means outputs, and to

perform expanding processing and a reducing process of an image, A graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, It is considered as an image compositing device which has a multiplexer means to compound the 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

0015A graphics operation means which an invention concerning Claim 4 of this invention inputs the 1st video signal, and a graphics screen signal is compounded, or can generate a graphics screen signal of the 2nd image, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input a detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform expanding processing and a reducing process of an image, A graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, It is considered as an image compositing device which has a multiplexer means to compound the 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal with a digital signal by a multiplexer using the above-mentioned graphics switch signal.

0016. whether an invention concerning Claim 5 of this invention inputs the 1st video signal, and compounds a graphics screen signal, and With or a condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in generating a graphics screen signal of the 2nd image. If it is shown that a graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, A graphics operation means which makes possible what a graphics screen signal of the 2nd image is not generated for, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and a graphics screen signal from the above-mentioned graphics operation means, It is considered as an image compositing device which has a multiplexer means to compound the 2nd video signal of the above with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

0017. whether an invention concerning Claim 6 of this invention inputs the 1st video signal, and compounds a graphics screen signal, and With or a condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in generating a graphics screen signal of the 2nd image. If it is shown that a graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, A graphics operation means which makes possible what a graphics screen signal of the 2nd image is not generated for, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and a graphics screen signal from the above-mentioned graphics operation means, It is considered as an image compositing device which has a multiplexer means to compound the 2nd video signal of the above with a digital signal by a multiplexer using the above-mentioned graphics switch signal.

0018In the image compositing device according to any one of claims 1 to 6, an invention concerning Claim 7 of this invention the above-mentioned graphics operation means, About significant figures, such as a character in a graphics screen, or a sign, It is considered as an image compositing device which has a scaling information recording device for performing expansion of those other than a significant figure section, or reduction, and a graphics scaling means to perform expansion of a graphics screen, or reduction using scaling information of the above-mentioned scaling information recording device.

0019A graphics screen information creating means which generates graphics screen information

which superimposes an invention concerning Claim 8 of this invention on a non-usual picture area field of a video signal, If a difference of time described in the part and time which a display or VTR has is less than constant value when the above-mentioned graphics screen information exists in a non-usual picture area field of the above-mentioned video signal, It is considered as an image compositing device which has a graphics screen reproduction means which superimposes a graphics screen signal based on graphics screen information in a usual picture area field.

0020In the image compositing device according to claim 8 an invention concerning Claim 9 of this invention, While taking out a program and a transport stream packet (it is described as TSP below) on which program information was recorded which are viewed, listened to which or recorded from a transport stream (it is described as TS below) of digital broadcasting, By adding fixed-length or variable-length number information which shows the number of TSP to cancel, or the number of TSP which is not canceled to the TSP to take out, Graphics screen information which a TSP filter means which outputs changed TS, and the above-mentioned graphics screen information creating means generate, While inserting in a TSP position canceled in TS changed from the above-mentioned TSP filter means, A TSP inserting means which corrects the above-mentioned number information to a number value of inserted TSP, and outputs it as changed TS, Changed TS which the above-mentioned TSP filter means or the above-mentioned TSP inserting means generates is inputted, TS reproduction means which only the number generates invalid TSP filled up with stuffing bytes, transposes these invalid TSP to a field to which number information is recorded, and carries out regeneration of TS from number information of the changed TS, It is considered as an image compositing device which has a TSP extraction means generated by the above-mentioned TSP inserting means to take out TSP in which graphics screen information was stored from changed TS, and to reproduce graphic information.

0021In the image compositing device according to claim 1, an invention concerning Claim 10 of this invention the above-mentioned multiplexer means, It is considered as an image compositing device performed by analog luminance signal Y, analog color difference signal R-Y and analog color difference signal B-Y or an analog R signal, analog G signal, and an analog B signal.

0022It is made for an invention concerning Claim 11 of this invention to output an enable signal which shows whether the above-mentioned graphics operation means is an effective area of a graphics screen of the 2nd image in the image compositing device according to any one of claims 1 to 7.

0023

Embodiment of the Invention(Embodiment 1) Below, the embodiment of the invention 1 corresponding to Claim 1 and Claim 2 of this invention is described using drawing 4 from drawing 1. Drawing 1 is a lineblock diagram of the image compositing device by this Embodiment 1, and explains the operation. in drawing 1 -- 1 -- a graphics operation part and 2 -- a memory and 3 -- a change machine and 5, an NTSC decoder and 7, a memory data processing part and 4 are displays, and, as for a multiplexer and 8, a synchronizing detection part and 6 explain **TV encoder and 9** operation below.

0024When displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9 and it is necessary to compound a graphics screen on a digital-broadcasting image, The graphics operation part 1 compounds the graphics picture data read from the above-mentioned memory 2 to a digital-broadcasting received image, and outputs to it to the multiplexer 7.

0025The memory data processing part 3 synchronizes with the synchronized signal of a digital-broadcasting received image inputted from the change machine 4 by which switching control is carried out with a microcomputer etc. at this time, The graphics picture data which exists in the above-mentioned memory 2 is read, and it compounds to the digital-broadcasting received image into which this is inputted, and outputs to the multiplexer 7.

0026The memory data processing part 3 outputs switch signal SW1, as the multiplexer 7 outputs the digital video signal with which the graphics screen from this memory data processing part 3 was compounded. The multiplexer 7 is changed according to switch signal SW1, and outputs the digital video signal with which the graphics screen was compounded to the TV encoder 8. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted.

0027When displaying an analog broadcasting received image like NTSC on the display 9 and it is necessary to compound a graphics screen to an analog broadcasting received image on the other

hand, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog broadcasting received images based on ITUR601 which is advice of the Digital Video signal, for example, and outputs to the multiplexer 7. The example of the graphics screen for analog broadcasting received images which the graphics operation part 1 generates is shown in drawing 2.

0028At this time, the synchronizing detection part 5 detects a synchronized signal from the analog broadcasting received image inputted, and outputs to the memory data processing part 3 via the change machine 4. The memory data processing part 3 reads the graphics picture data which exists in the memory 2 synchronizing with the synchronized signal of an analog broadcasting received image inputted, and outputs it to the multiplexer 7, and. Switch signal SW2 which shows whether effective graphics picture data is outputted to the multiplexer 7 is outputted to the multiplexer 7. This switch signal SW2 is an enable signal of a graphics screen, for example, the pixel in which a certain characteristic value exists among the picture element data of the graphics screen currently recorded on the memory 2 is a signal which shows that it is not picture element data of an effective graphics screen. The relation between the graphics screen of drawing 2 and switch signal SW2 when the specimen of the one line is carried out on this graphics screen is shown in drawing 3.

0029NTSC decoder 6 digitizes an analog broadcasting received image based on ITUR601, and outputs it to the multiplexer 7. By changing according to switch signal SW2 which the memory data processing part 3 generates, the multiplexer 7 generates the digital video signal with which the graphics screen was compounded, and outputs this to the TV encoder 8. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted. The example of the image with which the graphics screen was compounded by the analog broadcasting received image is shown in drawing 4.

0030By the way, the amount T1 of process delay of the graphics operation part 1 to the synchronized signal of an analog broadcasting received image, When the delaying amounts T2 of NTSC decoding of NTSC decoder 6 to the synchronized signal of an analog broadcasting received image differ, in the case of $T1 > T2$, By the processing process of NTSC decoder 6, what is necessary is just to perform delay adjustment of $(T1 - T2)$, and in the case of $T1 < T2$, A process delay difference can be easily compensated by what is necessary's being just to perform delay adjustment of $(T2 - T1)$ by the processing process of the graphics operation part 1, and delaying a synchronized signal, for example, since these delay is constant etc.

0031In this Embodiment 1, although composition of the graphics screen by the multiplexer 7 was performed to the digital signal, it may compound by carrying out the multiplexer of the analog signal. In this case, for example, if an analog broadcasting video signal is a composite video signal, The graphics screen of the signal which decoded this to analog luminance signal Y and analog color difference signal R-Y, and analog color difference signal B-Y, analog luminance signal **which the graphics operation part 1 generates** Y and analog color difference signal R-Y, and analog color difference signal B-Y is compounded. Thus, by performing analog composition in the state where the subcarrier signal of the video signal of NTSC does not exist, It can compound without receiving the influence of the frequency deviation of the subcarrier of two signals, or phase contrast to compound, and can stop that the color reproduction nature of the video signal after composition falls compared with composition with a composite video signal.

0032Thus, in the image compositing device by this Embodiment 1, While inputting the 1st video signal, and compounding a graphics screen signal to this or generating the graphics screen signal of the 2nd image, A graphics operation means to output the graphics switch signal which directs the change of this graphics screen signal, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from this 2nd video signal, The synchronized signal of the 1st video signal and the detection synchronized signal of the 2nd video signal that the above-mentioned synchronous detection means detects are inputted, The synchronized signal switching means which outputs one synchronized signal, and the signal or graphics screen signal with which it was superimposed on the graphics screen information from the above-mentioned graphics operation means, The graphics switch signal from the above-mentioned graphics operation means, The signal or graphics screen signal which inputted the 2nd video signal of the above and with which it was superimposed on the above-mentioned graphics screen information, By having had a multiplexer means to compound the 2nd video signal of the above with an analog

signal or a digital signal by the multiplexer using the above-mentioned graphics switch signal, Regardless of the kind whether the selected video signal is an analog or it is digital, to one video signal chosen from two video signals, A graphics screen can be generated only in one graphics operation part, and the image compositing device which can compound an image and this graphics screen can be obtained.

0033(Embodiment 2) The embodiment of the invention 2 corresponding to Claim 3 and Claim 4 of this invention is hereafter described using drawing 9 from drawing 5. Drawing 5 is a lineblock diagram of the image compositing device by this Embodiment 2, and explains the operation. In drawing 5, a graphics operation part and 2 change 1, a memory data processing part and 4 change a memory and 3, a synchronizing detection part and 6, a multiplexer and 8, a vessel and 5 are scaling parts and, as for TV encoder and 9, an NTSC decoder and 7 explain **a display and 210** operation below.

0034Since operation of an about is the same as that of the case of the above-mentioned Embodiment 1 when displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9, and it is necessary to compound a graphics screen to a digital-broadcasting received image, explanation is omitted.

0035When displaying an analog broadcasting received image like NTSC on the display 9 and it is necessary to compound a graphics screen to an analog broadcasting received image on the other hand, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog broadcasting received images based on ITUR601 which is advice of the Digital Video signal, for example, and outputs to the multiplexer 7. The example of the graphics screen for analog broadcasting received images which the graphics operation part 1 generates is shown in drawing 6.

0036At this time, the synchronizing detection part 5 detects a synchronized signal from the analog broadcasting received image inputted, and outputs to the memory data processing part 3 via the change machine 4. While the memory data processing part 3 reads the graphics picture data which exists in the memory 1 synchronizing with the synchronized signal of an analog broadcasting received image inputted and outputs it to the multiplexer 7, Switch signal SW2 which shows whether effective graphics picture data is outputted to the multiplexer 7 is outputted to the multiplexer 7. This switch signal SW2 is an enable signal of a graphics screen, for example, the pixel in which a certain characteristic value exists among the picture element data of the graphics screen currently recorded on the memory 2 is a signal which shows that it is not picture element data of effective graphics. The relation between the graphics screen of drawing 6 and switch signal SW2 when the specimen of the one line is carried out on this graphics screen is shown in drawing 7.

0037NTSC decoder 6 digitizes an analog broadcasting received image based on ITUR601 format, and outputs it to the scaling part 210. The scaling part 210 changes the screen size of the digitized analog broadcasting received image by scaling processing, and outputs it to the multiplexer 7 synchronizing with the detection synchronized signal inputted from the above-mentioned synchronizing detection part 5.

0038Processing generally known is performed in the scaling part 210. For example, the video memory which has a dual port for buffering of digital video is used, the object for the writing of a digital video data and another port read, and one port serves as business. When changing the screen size of an image, at the time of screen reduction, just before writing in video memory, infanticide of cutoff of a writing area, a pixel, or a line is performed, and after being read from video memory, pixel interpolation and line interpolation are performed at the time of screen expansion. The example of the screen of the image performed to drawing 8 by the scaling part 210 and the screen of the image after reduction scaling was carried out is shown.

0039By changing according to switch signal SW2 which the memory data processing part 3 generates, the multiplexer 7 generates the digital video signal with which the graphics screen was compounded, and outputs this to the TV encoder 8.

0040The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted. The example of the image with which the graphics screen was compounded by the analog broadcasting received image by which scaling was carried out to drawing 9 is shown.

0041By the way, the amount T201 of process delay of the graphics operation part 1 to the

synchronized signal of an analog broadcasting received image, In the case where the delaying amounts $T202$ of the NTSC decoder processing of NTSC decoder 6 to the synchronized signal of an analog broadcasting received image and processing of the scaling part 210 differ, In the case of $T201 > T202$, by the processing process of NTSC decoder 6 or the scaling part 210. What is necessary is just to perform delay adjustment of $(T201 - T202)$, and in the case of $T201 < T202$, By what is necessary being just to perform delay adjustment of $(T202 - T201)$ by the processing process of the graphics operation part 1, since these delay is constant, it can compensate a process delay difference easily, for example by delaying a synchronized signal etc.

0042 Thus, in the image compositing device by this Embodiment 2, The graphics operation means which the invention concerning Claim 3 of this invention inputs the 1st video signal, and a graphics screen signal is compounded, or can generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input the detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform the expanding processing and the reducing process of an image, The graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, The 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal, As opposed to one video signal chosen from two video signals by having had a multiplexer means to compound with an analog signal or a digital signal by the multiplexer using the above-mentioned graphics switch signal, While being able to generate a graphics screen only in one graphics operation part and being able to compound an image and this graphics screen regardless of the kind whether the selected video signal is an analog or it is digital, It can arrange and an image and the character shown in the graphics screen can be arranged so that it may not lap, and the image compositing device that an image will hide under a character and will disappear can be obtained.

0043 (Embodiment 3) Below, Embodiment 3 corresponding to Claim 5 and Claim 6 of this invention is described using drawing 14 from drawing 10. Drawing 10 is a lineblock diagram of the image compositing device by this Embodiment 3, and explains the operation. In drawing 10, 1 a graphics operation part and 2 a memory and 4 A change machine, 305 -- an NTSC decoder and 7, TV encoder and 9, a synchronizing detection part and 6 are buffering parts, and, as for a display and 310, a multiplexer and 8 explain **a memory data processing part and 311** operation below.

0044 Since operation of an about is the same as that of the case of the above-mentioned Embodiment 1 when displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9, and it is necessary to compound a graphics screen on a digital-broadcasting image, explanation is omitted. Here, the memory data processing part 310 by this Embodiment 3 carries out the same operation as the memory data processing part 3 by the above-mentioned Embodiment 1.

0045 When displaying analog video like NTSC on the display 8 and it is necessary to compound a graphics screen to analog video on the other hand, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog video based on ITUR601 which is advice of the Digital Video signal, for example, and outputs to the multiplexer 7.

0046 However, generation of the graphics screen for these analog video shall perform this depending on condition signal ST shown in drawing 10. This condition signal ST is what shows the signal state of analog video, When analog video is a standard signal like a broadcast received image (for example, suppose that the potential level of a condition signal is high-level), Generate the graphics screen for analog video and, in the case of a non-standard signal like the special reproduction image of VTR (for example, the potential level of a condition signal considers it as a low level), Since a synchronized signal turns into a non-standard signal as shown in drawing 11 (a), it is a thing for making it like which does not generate the graphics screen for analog video. That is, this condition signal ST is a signal which shows the state of analog video which apparatus by which the image compositing device by this Embodiment 3 is incorporated, such as VTR, has, for example.

0047Even if the above-mentioned analog video signal is a non-standard signal with a natural thing, At the time of detection of the synchronized signal by the synchronizing detection part 5, by using PLL, The synchronized signal (shown in drawing 11 (b)) with which the missing synchronization pulse part was amended is generated, and if composition of a graphics screen is always performed normally by this, the above-mentioned condition signal ST will take the same state as a standard signal.

0048The graphics operation part 1 shows the example of a graphics screen in case generation of the graphics screen for analog video is performed to drawing 12. When generation of the graphics screen for analog video is performed by the graphics operation part 1, the synchronizing detection part 305 detects a synchronized signal from the analog video inputted, and outputs this to the memory data processing part 310 via the change machine 4.

0049While the memory data processing part 310 reads the graphics picture data which exists in the memory 2 synchronizing with the synchronized signal of analog video inputted and outputting to the multiplexer 7, Switch signal SW2 which shows whether effective graphics picture data is outputted to the multiplexer 7 is outputted to the multiplexer 7. This switch signal SW2 is an enable signal of a graphics screen, for example, the pixel in which a certain characteristic value exists among the picture element data of the graphics screen currently recorded on the memory 2 is a signal which shows that it is not picture element data of effective graphics. The relation between the graphics screen of drawing 12 and switch signal SW2 when the specimen of the one line is carried out on this graphics screen is shown in drawing 13.

0050NTSC decoder 6 digitizes an analog video signal based on ITUR601, and outputs it to the buffering part 311. The buffering part 311 buffers the digitized analog video temporarily, and it synchronizes with the detection synchronized signal from the synchronizing detection part 305 into which this is inputted to the graphics operation part 1, Or synchronizing with the synchronized signal which the graphics operation part 1 generated, it outputs to the multiplexer 7.

0051Processing generally known is performed in this buffering part 311. For example, for buffering of digital video, the video memory which has a dual port is used, the object for the writing of a digital video data and another port read, one port serves as business, and the reading and writing to a memory are performed according to the synchronized signal inputted.

0052By changing according to switch signal SW1 which the memory data processing part 3 generates, the multiplexer 7 generates the digital video by which the graphics screen was compounded, and outputs this to the TV encoder 8. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted. The example of the image with which the graphics screen was compounded by analog video is shown in drawing 14.

0053By the way, the amount T301 of process delay of the graphics operation part 1 to the synchronized signal of an analog broadcasting received image, In the case where the delaying amounts T302 of NTSC decoder processing of NTSC decoder 6 and processing of the buffering part 311 to the synchronized signal of an analog video signal differ, In the case of $T301 > T302$, by the processing process of NTSC decoder 6 or the buffering part 311. What is necessary is just to perform delay adjustment of $(T301 - T302)$, and in the case of $T301 < T302$, By what is necessary being just to perform delay adjustment of $(T302 - T301)$ by the processing process of the graphics operation part 1, since these delay is constant, it can compensate a process delay difference easily, for example by delaying a synchronized signal etc.

0054Thus, in the image compositing device by this Embodiment 3, With the condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in inputting the 1st video signal, and compounding a graphics screen signal or generating the graphics screen signal of the 2nd image. If it is shown that the graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, The graphics operation means which makes possible what the graphics screen signal of the 2nd image is not generated for, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics

operation means, As opposed to one video signal chosen from two video signals by having had a multiplexer means to compound the 2nd video signal of the above with an analog signal or a digital signal by the multiplexer using the above-mentioned graphics switch signal, Regardless of the kind whether the selected video signal is an analog or it is digital, based on a condition signal, a graphics screen can be generated and the image compositing device which can compound an image and this graphics screen can be obtained only in one graphics operation part.

0055(Embodiment 4) Below, Embodiment 4 corresponding to Claim 7 of this invention is described using drawing 19 from drawing 15. Drawing 15 is a lineblock diagram of the image compositing device by this Embodiment 4, and explains the operation. In drawing 15, 1 a graphics operation part and 2 a memory and 4 A change machine, A synchronizing detection part and 6 for 5 an NTSC decoder and 7 a multiplexer and 8 TV encoder, 9 -- a display and 410 -- the scaling information Records Department and 412, a down converter and 414, a memory data processing part and 411 are the displays for NTSC, and, as for a multiplexer and 415, an up converter and 413 explain **TV encoder and 416** operation below.

0056Since operation of an about is the same as that of the case of the above-mentioned Embodiment 1 when displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9, and it is necessary to compound a graphics screen to a digital-broadcasting received image, explanation is omitted. Here, operation of the memory data processing part 410 by this Embodiment 3 carries out the same operation as the memory data processing part 3 by the above-mentioned Embodiment 1.

0057In the case where digital-broadcasting received images, such as digital HDTV, are displayed on the display 416 for NTSC, When it is necessary to compound a graphics screen to a digital-broadcasting received image, the graphics operation part 1 compounds a graphics screen to a digital-broadcasting received image, and outputs to the down converter 413. The memory data processing part 410 synchronizes with the synchronized signal of a digital-broadcasting received image inputted from the change machine 4 by which switching control is carried out with a microcomputer etc. at this time, The graphics picture data which exists in the memory 2 is read, and it compounds to the digital-broadcasting received image into which this is inputted, and outputs to the down converter 413.

0058The down converter 413 carries out the down convert of the digital HDTV image inputted to an NTSC image, and outputs it to the multiplexer 414. As the graphics operation part 1 outputs the signal from the down converter 413 to the multiplexer 414, it outputs switch signal SW1. The multiplexer 414 outputs the signal from the down converter 413, i.e., the digital-broadcasting received image by which the down convert was carried out to the image of NTSC, to NTSC encoder 415 according to switch signal SW1 which the graphics operation part 1 generates. The digital video signal inputted is changed into an analog signal, and NTSC encoder 415 outputs it to the display 416. The display 416 displays the image of the video signal inputted.

0059When displaying an analog broadcasting received image like NTSC on the display 9 for HDTV, in compounding a graphics screen to an analog broadcasting received image, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog broadcasting received images by the same screen format as HDTV, While outputting to the multiplexer 7, the synchronized signal of HDTV is outputted to the up converter 412. While the memory data processing part 410 reads the graphics picture data which exists in the memory 2 synchronizing with the synchronized signal of an analog broadcasting received image inputted and outputs it to the multiplexer 7 at this time, Switch signal SW2 which shows whether effective graphics picture data is outputted to the multiplexer 7 is outputted to the multiplexer 7.

0060NTSC decoder 6 digitizes an analog broadcasting received image based on ITUR601 format, and outputs it to the up converter 412. The up converter 412 changes the digitized analog broadcasting received image into the screen size of HDTV, and outputs the image which carried out upconverting of NTSC to the multiplexer 7 synchronizing with the synchronized signal of the above-mentioned HDTV from the graphics operation part 1.

0061By changing according to the switch signal which the memory data processing part 410 generates, the multiplexer 7 generates the digital-broadcasting received image by which the graphics screen was compounded, and outputs this to the TV encoder 8. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9

displays the image of the video signal inputted.

0062By the way, the delaying amount T401 of processing of NTSC decoder 6 and the up converter 411 to the synchronized signal of an analog broadcasting received image, When the delaying amounts T402 of processing of the graphics operation part 401 to the synchronized signal of an analog broadcasting received image differ, in the case of $T401 > T402$, By the processing process of NTSC decoder 6 or the up converter 412, what is necessary is just to perform delay adjustment of $(T401 - T402)$, and in the case of $T401 < T402$, A process delay difference can be easily compensated by what is necessary's being just to perform delay adjustment of $(T402 - T401)$ by the processing process of the graphics operation part 1, and delaying a synchronized signal, for example, since these delay is constant etc.

0063When displaying an analog broadcasting received image like NTSC on the display 416 for NTSC and it is necessary to compound a graphics screen on an analog broadcasting image, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog broadcasting images. The example of the graphics screen of HDTV screen size is shown in drawing 16.

0064At this time, the memory data processing part 410 generates the graphics screen for analog broadcasting images based on the information of the scaling information Records Department 411 by carrying out a down convert from the graphics screen of HDTV size to the graphics screen of NTSC size. The usual picture area field of HDTV size For example, **per frame, 1920 pixels wide**, When it is the length of 1080 lines and the usual picture area field of NTSC size carries out the down convert of this to the screen size which are 720 pixels wide and the length of 480 lines per frame, Although it is necessary to cancel 1200 lines to a lengthwise direction and to cancel 600 lines in a transverse direction from the usual picture area field of HDTV size, for example, it is recorded on the scaling information Records Department 411 which lengthwise direction line and a transverse direction line are canceled. The information currently recorded on this scaling information Records Department 411, Are a total of binary 1080-bit 3000-bit information +1920-bit, and 1080 bits of the first half, It is shown one by one from the line of a usual picture area upper bed whether a transverse direction line should be canceled, 1920 bits of the second half show one by one whether a lengthwise direction line should be canceled from a usual picture area left end, and means that 1 cancels, and it means that zero do not cancel. For example, if the value of the beginning of the scaling information Records Department 411 is 1, it means canceling the upper bed side of one line of the usual picture area field of HDTV size. For example, if the 1081st value of the scaling information Records Department 411 is zero, it means not canceling left end length of one line of the usual picture area field of HDTV size.

0065The memory data processing part 410 acquires a pixel required for a down convert from the picture data of the HDTV size of the memory 2, referring to each of this value of a total of 3000 bits. At this time, the graphics screen which the memory data processing part 410 generates, Without canceling the pixel of the field in the memory 2 which constitutes a significant figure at least, It is the feature of this Embodiment 4 to be used, when the information which is acquired altogether, is generated and should be generated such is recorded on the scaling information Records Department 411 and scaling is performed. The figure which specified the portion thinned out in the graphics screen of HDTV screen size is shown in drawing 17. The example of the graphics screen of the NTSC screen size which the memory data processing part 3 thins out and outputs to drawing 18 with reference to the information of the scaling information Records Department is shown.

0066At this time, although the synchronizing detection part 5 will read graphics picture data from the memory 2 and will output the memory data processing part 410 to the down converter 413 synchronizing with the synchronized signal which is detected, is changed from an analog broadcasting received image, and is outputted via the vessel 4, About acquisition of a transverse direction line, calculation of a cancellation line and position computation in the memory in which the next acquisition line exists are performed during the non-usual picture area field of one line. When the transverse direction line to cancel is continuing, although the gate time of the cancellation line increases in proportion to a cancellation line number, a bit value which the calculation ends during the non-usual picture area field of one line is recorded on the scaling information Records Department 411. For example, the period of one line of a non-usual picture area field is 10000 ns, If time for 1 calculation of the continuation cancellation line by bit

information continuation read-out from the scaling information Records Department 411 to set up the acquisition line read from the memory 2 for 50 ns is 100 ns, Continuation line cancellation can be set up to 186 lines ($10000\text{ns}-100\text{ns}=9900\text{ns}$, $9900\text{ns}/50\text{ns} = 198$ lines). That is, although it means that 198 pieces may follow the scaling information Records Department 411, and zero may exist in it, 198 lines is not canceled continuously in practice, therefore continuation reading processing from a memory is performed smoothly.

0067In this way, although it is necessary to acquire the pixel which generates a graphics screen further out of all the pixels in read one line, About this, the FIFO memory for the pixel number per line of NTSC (for example, it is enough if it is by 858 pixels) is used, for example, Distinguish whether it inputs into the above-mentioned FIFO by beginning to read the bit information from the head of the scaling information Records Department 411 one by one, and investigating a value, when a value is 1, input, but. When a value is zero, while controlling not to input and beginning to read in a similar manner one by one by the following pulse of the above-mentioned detection synchronized signal further, The graphics screen of NTSC screen size is generable by repeating a series of operations of inputting the acquisition pixel of a succeeding line similarly. Thus, the memory data processing part 410, While outputting the graphics picture data acquired from the memory 2 to the multiplexer 414, switch signal SW1 which shows whether still more effective graphics picture data is outputted to the multiplexer 414, and SW2 are outputted to the multiplexer 414.

0068Synchronizing with the synchronized signal of an analog broadcasting received image into which the memory data processing part 3 is inputted as mentioned above, the graphics picture data which exists in the memory 2 is down-convert-outputted to the down converter 413 based on the information of the scaling information Records Department 411. The down converter 413 outputs the graphics screen already changed and inputted into the screen size of NTSC to the multiplexer 414 as it is.

0069NTSC decoder 6 digitizes an analog broadcasting received image based on ITUR601, and outputs it to the multiplexer 414. The multiplexer 414 is changed according to above-mentioned switch signal SW1 which the memory data processing part 410 generates, and SW2, and outputs the digital video signal with which the graphics screen was compounded to NTSC encoder 415. Switch signal SW1 which the memory data processing part 410 generates at this time, and SW2 are the signals that a graphics screen is compounded by the digitized analog broadcasting received image.

0070Therefore, the output of the multiplexer 414 serves as a digital signal with which the graphics screen was compounded by the analog broadcasting received image. The digital video signal inputted is changed into an analog signal, and NTSC encoder 415 outputs it to the display 416 for NTSC. The display 416 for NTSC displays the image of the video signal inputted. The example of the image with which the graphics screen was compounded by the analog broadcasting received image is shown in drawing 19.

0071By the way, the graphics operation part 1 to the synchronized signal of an analog broadcasting received image and the amount T403 of process delay of the down converter 413, When the delaying amounts T404 of processing of the NTSC decoder processing of NTSC decoder 6 to the synchronized signal of an analog broadcasting received image differ, in the case of $T403 > T404$, By the processing process of NTSC decoder 6, what is necessary is just to perform delay adjustment of $(T403-T404)$, and in the case of $T403 < T404$, A process delay difference can be easily compensated by what is necessary's being just to perform delay adjustment of $(T404-T403)$ by the processing process of the graphics operation part 1 and the down converter 413, and delaying a synchronized signal, for example, since these delay is constant etc.

0072Thus, in the image compositing device by this Embodiment 4, In the image compositing device by the above-mentioned Embodiments 1 thru/or 3, a graphics operation means, About significant figures, such as a character in a graphics screen, or a sign, The scaling information recording device for performing expansion of those other than a significant figure section, or reduction, By having had a graphics scaling means to perform expansion of a graphics screen, or reduction using the scaling information of the above-mentioned scaling information recording device, With the condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in inputting the 1st video signal, and compounding a graphics screen signal or generating the graphics screen signal of the 2nd image. If it is shown that

the graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, The graphics operation means which makes possible what the graphics screen signal of the 2nd image is not generated for, the synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, and the synchronized signal of the 1st video signal, The detection synchronized signal of the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, By having had a multiplexer means to compound the 2nd video signal of the above with an analog signal or a digital signal by the multiplexer using the above-mentioned graphics switch signal, The selected video signal regardless of the kind whether to be an analog or to be digital, to one video signal chosen from two video signals only in one graphics operation part. A graphics screen can be generated and the image compositing device which can compound an image and this graphics screen can be obtained.

0073(Embodiment 5) Below, Embodiment 5 corresponding to Claim 8 of this invention is described using drawing 23 from drawing 20. Drawing 20 is a lineblock diagram of the image compositing device by this Embodiment 5. In drawing 20, 1 a graphics operation part and 2 a memory and 3 A memory data processing part, A change machine and 5 for 4 a synchronizing detection part and 6 an NTSC decoder and 7 A multiplexer, 8 -- a display and 510, a graphics screen information generation part and 512, TV encoder and 9 are change machines and, as for a graphics screen regenerating section and 513, VTR and 511 explain **a change machine and 514** operation below.

0074When displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9 and it is necessary to compound a graphics screen to a digital-broadcasting received image, the graphics operation part 1 compounds a graphics screen to a digital-broadcasting received image, and outputs to the multiplexer 7.

0075The memory data processing part 3 synchronizes with the synchronized signal of a digital-broadcasting received image inputted from the change machine 4 by which switching control is carried out with a microcomputer etc. at this time, The graphics picture data which exists in the memory 2 is read, is compounded to the digital-broadcasting received image inputted, and it outputs to the graphics screen information generation part 511.

0076The graphics screen information generation part 511 changes switch signal SW3, and sends it to the vessel 513 so that the signal of the graphics screen information generation part 511 may be outputted to the change machine 513, As the memory data processing part 3 outputs the signal from the change machine 513, it outputs switch signal SW4 to the multiplexer 7.

0077The digital-broadcasting received image by which the graphics screen was compounded is outputted to the TV encoder 8 by changing the change machine 513 and the multiplexer 7 according to switch signal SW3 and SW4, respectively. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted.

0078By the way, in the case where an analog broadcasting received image like NTSC is recorded on VTR510, When it is necessary to compound a graphics screen on an analog broadcasting image, If the analog video by which the graphics screen for analog broadcasting images which the graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images by the above-mentioned processing generates was compounded is recorded, it will be recorded to the compounded graphics screen.

0079Then, in recording analog video, while the graphics screen information generation part 511 generates graphics screen information and outputs to the multiplexer 7 via the change machine 513, Synchronizing with the detection synchronized signal from a synchronizing detection part, switch signal SW5 for superimposing this graphics screen information on a non-usual picture area field is outputted to the multiplexer 7.

0080The graphics screen information which the graphics screen information generation part 511 generates is the character code group which constitutes a graphics screen, a display position of these character codes, a foreground color, a background color, and generating time, for example. In the case of an NTSC image, as the amount of information superimposed on a non-usual picture area field, For example, it is superimposed on 40 lines per frame excluding the line for closed caption information superposition, and the line for CGMS-A information superposition including

duplicate propriety information, and 64 bits per line as this graphics screen information. In this case, in a case so that it may be 64 bits **per frame / 40 lines** $x = 2560 \text{ bits} = 320 \text{ bytes}$ in amount of information and a character may be displayed on a graphics screen, As time information, or sexual desire news and attribution information, even if it occupies 200 bytes, for example, it becomes possible to assign remaining 120 bytes to text, and this is value sufficient as an amount of text per frame. To drawing 21, the example of a graphics screen and the information recorded on a non-usual picture area field are illustrated. The graphics screen in drawing 21 shows that it was generated at 13:05 on July 10, 1998, and supposes that character string "ABC" and character string "DEF" has an attribute in a figure, and is displayed.

0081The information on the graphics screen of drawing 21 recorded on a non-usual picture area field and a wave-like example are shown in drawing 22. By drawing 22, in order to make it intelligible, the case where 8 bits per line are superimposed is shown. In the bit string "1111010000001001" of drawing 22, 8 bits "11110100" of a head show "T" and 8 bits "00001001" of the second half show "9." Above, although the graphics information superimposed on a non-usual picture area field was explained as text, arbitrary information, including a sign, a figure, etc., may be sufficient as it.

0082An analog broadcasting received image is digitized by NTSC decoder 6, and is outputted to the multiplexer 7 via the change machine 514. The multiplexer 7 is changed according to switch signal SW6 which the graphics screen information generation part 511 generates, and outputs the digital video by which the graphics screen was compounded to the TV encoder 8. At this time, switch signal SW6 which the graphics screen information generation part 511 generates is the signal that the specific non-usual picture area field of the digitized analog broadcasting image is overlapped on graphics screen information. Therefore, the output of the multiplexer 7 serves as a digital signal with which the analog broadcasting received image was overlapped on graphics screen information.

0083The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to VTR510. VTR510 records the video signal inputted.

0084When the analog video signal with graphics screen information recorded as mentioned above is played, The graphics screen information of a non-usual picture area field is acquired, a graphics screen is reproduced from this graphics screen information, and with the change machine 514, the graphics screen regenerating section 512 carries out a multiplexer, and generates. This reproduction by PLL locked to a synchronized signal pulse generating the clock for taking out graphics screen information, and, for example, sampling it from the Horizontal Synchronizing signal of a video signal, using this, Bit information will be acquired and graphics screen information will be obtained further. A graphics screen can be obtained by developing the bit map of a graphics screen from this graphics screen information to the video memory in the graphics screen regenerating section 512, and reading graphics picture data from a memory according to a synchronized signal. As this memory, the memory 2 other than the memory which it has in graphics screen regenerating section 512 inside may be used by common use. And if this graphics screen is compounded synchronizing with the synchronized signal of a video signal, the image by which the graphics screen was compounded will be acquired.

0085At this time, the graphics screen regenerating section 512 outputs switch signal SW6 for superimposing that reproduction screen signal on a video signal to the change machine 514. This switch signal SW6 is an enable signal of a graphics screen, for example, the pixel in which a certain characteristic value exists among the picture element data of a graphics screen is a signal which shows that it is not picture element data of effective graphics.

0086The change machine 514 is changed according to switch signal SW6 which the graphics screen information generation part 511 generates, Outputting the digital video by which the graphics screen was compounded to the multiplexer 7, the multiplexer 7 outputs the digital video by which the graphics screen was compounded to the TV encoder 8 as it is. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted.

0087The image before a graphics screen is compounded by drawing 23, and the compounded image are illustrated. By the way, the generation and composition of a graphics screen with the above-mentioned graphics screen regenerating section 512 and the change machine 514, If a difference with the time which could also give display 9 inside and was recorded the present time

and in the non-usual picture area field in this case is less than constant value (for example, less than 1 second), If a difference with the time which judged that a graphics screen should have been displayed, performed reproduction and composition of the graphics screen, and was recorded in the non-usual picture area field is beyond constant value (for example, 1 seconds or more), If it is playback from the tape already recorded on VTR, etc., it judges that it is not necessary to display a graphics screen promptly and it is made not to perform playback of a graphics screen, and composition, The image by which the graphics screen for a display was compounded, and the image by which the graphics screen for recording is not compounded, It is not necessary to generate two **, and it is only generating one video signal on which the non-usual picture area field was overlapped, and graphics screen information can use this now for both a display and recording. When a televiewer enables it to choose the display of a graphic screen, according to a televiewer's intention, the image by which the graphics screen was compounded, and the image which is not compounded are chosen and displayed, and it can view and listen to it.

0088The above-mentioned graphics information is the same method as the above as a thing corresponding to a digital-broadcasting received image, and may be superimposed by the non-usual picture area field of a digital-broadcasting received video signal.

0089In the case where an analog broadcasting received image like NTSC is displayed **in / with a natural thing / this Embodiment 5** on the display 9, for example when not recording on VTR, When it is necessary to compound a graphics screen to an analog broadcasting received image, As carried out by the above-mentioned Embodiment 1, the graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images, The graphics screen for analog broadcasting received images is generated based on ITUR601 which is advice of the Digital Video signal, for example, and it may be made to compound with the analog broadcasting received image digitized by the multiplexer 7.

0090Thus, in the image compositing device by this Embodiment 5, The graphics screen information creating means which generates the graphics screen information superimposed on the non-usual picture area field of a video signal, If the difference of the time described in the part and the time which a display or VTR has is less than constant value when the above-mentioned graphics screen information exists in the non-usual picture area field of the above-mentioned video signal, By having had the graphics screen reproduction means which superimposes the graphics screen signal based on graphics screen information in a usual picture area field, Regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen and graphics screen information are generable only in one graphics operation part to one video signal chosen from the video signal of two numbers. Even if it is a case where it records on VTR, displaying with a display the video signal with which the graphics screen was compounded, The image by which the graphics screen for a display was compounded, and the image by which the graphics screen for recording is not compounded, It is not necessary to generate two and graphics screen information available to both a display and recording can provide the image compositing device which can generate the image on which the non-usual picture area field was overlapped.

0091In the above-mentioned Embodiments 1 thru/or 5, The selected video signal regardless of the kind whether to be an analog or to be digital, to one video signal chosen from two video signals only in one graphics operation part. The image compositing device which can compound a graphics screen and a video signal can be provided. The video signals which should be chosen **above-mentioned** with a natural thing may be three or more video signals.

0092(Embodiment 6) The portion the image compositing device by the embodiment of the invention 8 is indicated to be to drawing 24 at the image compositing device of the above-mentioned Embodiment 5 is added. In drawing 24, as for a TSP filter part and 611, a TSP regenerating section and 613 are TSP extract sections, and, as for 610, a TSP insert portion and 612 explain operation below.

0093The TSP filter part 610 is a transport stream (decided upon this by MPEG 2 standard system parts and ITU-TRecH.222.0|ISO/IEC 13818-1.) of digital broadcasting, as shown in drawing 25. it is described as TS below. from, while taking out the transport stream packet (it is described as TSP below) on which the program and program information which are viewed, listened to which or recorded were recorded, Changed TS is outputted by adding the fixed-length or variable-length number information which shows the number of TSP to cancel, and the number of TSP which is not canceled to the TSP to take out.

0094. As the TSP insert portion 611 is shown in drawing 26, it can set to the above-mentioned Embodiment 5. The graphics screen information which the graphics screen information creating means 511 generates, According to an MPEG 2 standard, according to syntax, a definition is given, for example as one private data, and this is inserted in the TSP position canceled in TS changed from the above-mentioned TSP filter means, and is outputted as changed TS. At this time, it also performs correcting the above-mentioned number information with the number value of inserted TSP. Values other than the value which is already specified and is assigned are used for the value for identifying the data in TSP, such as PID and table ID, in insertion of TSP in which graphics screen information was stored. In the above-mentioned Embodiment 5, graphics screen information is considering it as 320 bytes, and at least two TSP is needed for storing this. Generally TSP of only the number which can store the amount of graphics screen information is generated, and it inserts in TS. It may be the head and the backmost part of TS which make the insertion point of this TSP the object of handling with the natural thing.

0095The TS regenerating section 612 inputs changed TS which the above-mentioned TSP filter means 610 or the above-mentioned TSP inserting means 611 generates, as shown in drawing 27, Regeneration of TS is carried out by only the number's generating invalid TSP filled up with stuffing bytes from the number information of the changed TS, and transposing these invalid TSP to the field to which number information is recorded.

0096The example of invalid TSP constituted according to the system parts of an MPEG 2 standard is shown in drawing 28. In drawing 28, in 1TSP which comprises 188 bytes, behind 4 bytes of head, The adaptation field which was 184 bytes continues, stuffing bytes are inserted in 182 bytes of back in the adaptation field, and invalid TSP is constituted. As shown in drawing 29, TSP extract section 613 takes out TSP in which graphics screen information was stored from changed TS which was generated by the above-mentioned TSP inserting means 611, and reproduces graphic information.

0097In the image compositing device by this Embodiment 6, While being able to record without making a record section useless by taking out only TSP required for record from TS efficiently, Since the number of canceled TSP is known also when reproducing it by the TSP regenerating section 612, TS which can use the hour entry in TSP called PCR effectively can be reproduced, and, for this reason, it can process normally also by inputting this reproduced TS into the device which processes TSP called a TS decoder, for example.

0098TSP in which graphics screen information was stored is inserted in TS, it can record now on an archive medium, this recorded TS can be reproduced, and a graphics screen can be compounded. TSP in which graphics screen information was stored with the natural thing may be generated as one or more independent TS. Graphics screen information may not be limited to a digital-broadcasting received image, and may be the graphics screen information for analog broadcasting received images.

0099Although unnecessary TSP was canceled, number information was added and the TSP insert portion 611 explained in the above as what inserts TSP at the TSP filter part 610, What is necessary is just to generate as another 1TS in which graphics screen information was stored about the handling of the graphics screen information of a case so that one TS may be recorded as it is, without canceling TSP.

0100Thus, in the image compositing device by this Embodiment 6, In the image compositing device by the above-mentioned Embodiment 5, from the transport stream (it is described as TS below) of digital broadcasting. While taking out the program and the transport stream packet (it is described as TSP below) on which program information was recorded which are viewed, listened to which or recorded, By adding the fixed-length or variable-length number information which shows the number of TSP to cancel, or the number of TSP which is not canceled to the TSP to take out, The graphics screen information which the TSP filter means which outputs changed TS, and the above-mentioned graphics screen information creating means generate, While inserting in the TSP position canceled in TS changed from the above-mentioned TSP filter means, The TSP inserting means which corrects the above-mentioned number information to the number value of inserted TSP, and outputs it as changed TS, Input changed TS which the above-mentioned TSP filter means or the above-mentioned TSP inserting means generates, and only the number generates invalid TSP filled up with stuffing bytes from the number information of the changed TS, and these invalid TSP is transposed to the field to which number information is recorded, TSP in which graphics

screen information was stored is taken out from changed TS which was generated by TS reproduction means which carries out regeneration of TS, and the above-mentioned TSP inserting means, While changed TS in which the minimum data that contains graphics screen information by having had a TSP extraction means to reproduce graphic information was stored is generable, By reproducing graphics screen information from this changed TS, a graphics screen is generable.

0101

Effect of the InventionAs mentioned above, while according to the invention concerning Claim 1 of this invention inputting the 1st video signal, and compounding a graphics screen signal to this or generating the graphics screen signal of the 2nd image, A graphics operation means to output the graphics switch signal which directs the change of this graphics screen signal, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, The graphics switch signal from the above-mentioned graphics operation means, The 2nd video signal of the above is inputted and it is considered as the image compositing device which has a multiplexer means to compound the above-mentioned graphics screen signal and the 2nd video signal of the above with an analog signal by the multiplexer using the above-mentioned graphics switch signal. By this an above-mentioned graphics operation means to compound a graphics screen on the 1st image, With the detection synchronized signal of the 2nd video signal inputted via the above-mentioned switching means, generate the graphics screen signal compounded to the 2nd video signal, and the above-mentioned multiplexer means, By compounding the graphics screen signal and the 2nd image which are compounded on the 2nd image with an analog signal, Regardless of the kind whether the selected video signal is an analog or it is digital, to the video signal chosen from two or more video signals, Since a graphics screen signal or the signal with which it was superimposed on graphics screen information can be generated only in one graphics operation part and it can compound with a video signal, While being able to aim at the cost cut of a device, the graphics screen of a comfortable image unified into the televiewer to each video signal can be provided.

0102The graphics operation means which according to the invention concerning Claim 2 of this invention the 1st video signal is inputted, and a graphics screen signal is compounded, or can generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, The graphics switch signal from the above-mentioned graphics operation means, The 2nd video signal of the above is inputted and it is considered as the image compositing device which has a multiplexer means to compound the above-mentioned graphics screen signal and the 2nd video signal of the above with an analog signal by the multiplexer using the above-mentioned graphics switch signal. By this an above-mentioned graphics operation means to compound a graphics screen signal on the 1st image, With the detection synchronized signal of the 2nd video signal inputted via the above-mentioned switching means, generate the graphics screen signal compounded to the 2nd video signal, and the above-mentioned multiplexer means, By compounding the graphics screen signal and the 2nd image which are compounded to the 2nd video signal with a digital signal, To one video signal chosen from two or more video signals, regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen is generated only in one graphics operation part, and an image and this graphics screen can be compounded.

0103The graphics operation means which according to the invention concerning Claim 3 of this invention the 1st video signal is inputted, and a graphics screen signal is compounded, or can generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to

input the detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform the expanding processing and the reducing process of an image, The graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, It is considered as the image compositing device which has a multiplexer means to compound the 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal with an analog signal by the multiplexer using the above-mentioned graphics switch signal. By this an above-mentioned graphics operation means to compound a graphics screen signal on the 1st image, With the detection synchronized signal of the 2nd video signal inputted via the above-mentioned switching means, generate the graphics screen signal compounded to the 2nd video signal, and the above-mentioned scaling means, Expand or reduce, output the 2nd image and the above-mentioned multiplexer means, By compounding the graphics screen signal compounded to the 2nd video signal, and the 2nd video signal after scaling with an analog signal, To one video signal chosen from two or more video signals. **whether the selected video signal is an analog and** While being able to generate a graphics screen only in one graphics operation part and being able to compound an image and this graphics screen regardless of the kind whether to be digital, It can arrange and an image and the character shown in the graphics screen can be arranged so that it may not lap, and it can be prevented from an image hiding under a character and disappearing.

0104The graphics operation means which according to the invention concerning Claim 4 of this invention the 1st video signal is inputted, and a graphics screen signal is compounded, or can generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input the detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform the expanding processing and the reducing process of an image, The graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, It is considered as the image compositing device which has a multiplexer means to compound the 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal with a digital signal by the multiplexer using the above-mentioned graphics switch signal. By this an above-mentioned graphics operation means to compound a graphics screen signal on the 1st image, With the detection synchronized signal of the 2nd video signal inputted via the above-mentioned switching means, generate the graphics screen signal compounded to the 2nd video signal, and the above-mentioned scaling means, Expand or reduce, output the 2nd image and the above-mentioned multiplexer means, By compounding the graphics screen signal compounded to the 2nd video signal, and the 2nd video signal after scaling with a digital signal, To one video signal chosen from two or more video signals. **whether the selected video signal is an analog and** While being able to generate a graphics screen only in one graphics operation part and being able to compound an image and this graphics screen regardless of the kind whether to be digital, It can arrange and an image and the character shown in the graphics screen can be arranged so that it may not lap, and it can be prevented from an image hiding under a character and disappearing.

0105. whether the invention concerning Claim 5 of this invention inputs the 1st video signal, and compounds a graphics screen signal, and With or the condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in generating the graphics screen signal of the 2nd image. If it is shown that the graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, The graphics operation means which makes possible what the graphics screen signal of the 2nd image is not generated for, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics

operation means, It is considered as the image compositing device which has a multiplexer means to compound the 2nd video signal of the above with an analog signal by the multiplexer using the above-mentioned graphics switch signal. By this, in generating the graphics screen signal of the 2nd image, . **whether the 2nd video signal is a video signal which can compound a graphics screen like the standard signal by broadcast reception of a tuner, etc., and** With or the condition signal whether to be a special reproduction signal of an analog tape with VTR, and to be a video signal which cannot compound a graphics screen like the non-standard signal with which a synchronization pulse is not amended. When the above-mentioned condition signal shows that composition of a graphics screen is possible, Generate the graphics screen signal of the 2nd image and the above-mentioned multiplexer means, The graphics screen signal and the 2nd analog video signal of the above which are compounded to the 2nd video signal are compounded, When the above-mentioned condition signal shows that composition of a graphics screen is impossible, By making it not generate the graphics screen signal of the 2nd image, the above-mentioned graphics operation means, Regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen is generated only in one graphics operation part based on a condition signal to one video signal chosen from two or more video signals, An image and this graphics screen are compoundable.

0106. whether the invention concerning Claim 6 of this invention inputs the 1st video signal, and compounds a graphics screen signal, and With or the condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in generating the graphics screen signal of the 2nd image. If it is shown that the graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, The graphics operation means which makes it possible not to generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, It is considered as the image compositing device which has a multiplexer means to compound the 2nd video signal of the above with a digital signal by the multiplexer using the above-mentioned graphics switch signal. By this, in generating the graphics screen signal of the 2nd image, . **whether the 2nd video signal is a video signal which can compound a graphics screen like the standard signal by broadcast reception of a tuner, etc., and** With or the condition signal whether to be a special reproduction signal of an analog tape with VTR, and to be a video signal which cannot compound a graphics screen like the non-standard signal with which a synchronization pulse is not amended. When the above-mentioned condition signal shows that composition of a graphics screen is possible, Generate the graphics screen signal of the 2nd image and the above-mentioned multiplexer means, The graphics screen signal and the 2nd digital video signal of the above which are compounded to the 2nd video signal are compounded, When the above-mentioned condition signal shows that composition of a graphics screen is impossible, By not generating the graphics screen signal of the 2nd image, the above-mentioned graphics operation means, Regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen is generated only in one graphics operation part based on a condition signal to one video signal chosen from two or more video signals, An image and this graphics screen are compoundable.

0107In the image compositing device according to any one of claims 1 to 6, the invention concerning Claim 7 of this invention the above-mentioned graphics operation means, About significant figures, such as a character in a graphics screen, or a sign, It is considered as the image compositing device which has a scaling information recording device for performing expansion of those other than a significant figure section, or reduction, and a graphics scaling means to perform expansion of a graphics screen, or reduction using the scaling information of the above-mentioned scaling information recording device. By this the above-mentioned graphics scaling means in the above-mentioned graphics operation means, In performing expansion and reduction of a graphics screen, By setting the horizontal line and vertical pixel row in which the significant figure of a graphics screen does not exist as the object of expanding processing or a reducing process using

the information on a scaling information recording device, The selected video signal regardless of the kind whether to be an analog or to be digital, to one video signal chosen from two or more video signals only in one graphics operation part. A graphics screen can be generated and the image compositing device which can compound an image and this graphics screen can be obtained.

0108The graphics screen information creating means which generates the graphics screen information which superimposes the invention concerning Claim 8 of this invention on the non-usual picture area field of a video signal, If the difference of the time described in the part and the time which a display or VTR has is less than constant value when the above-mentioned graphics screen information exists in the non-usual picture area field of the above-mentioned video signal, It is considered as the image compositing device which has a graphics screen reproduction means which superimposes the graphics screen signal based on graphics screen information in a usual picture area field. While this displays with a display the video signal with which the graphics screen signal was compounded, even if it is a case where it records on VTR, It is not necessary to generate two, the image for the display by which the graphics screen was compounded, and the image for the recording by which the graphics screen is not compounded. The 1st graphics screen information only with one image on which the non-usual picture area field was overlapped. As opposed to one video signal chosen from the video signal of two or more numbers by the ability to use for a display and recording, Regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen and graphics screen information are generable only in one graphics operation part. Even if it is a case where it records on VTR, displaying with a display the video signal with which the graphics screen was compounded, It is not necessary to generate two, the image by which the graphics screen for a display was compounded, and the image by which the graphics screen for recording is not compounded, and graphics screen information available to both a display and recording can generate the image on which the non-usual picture area field was overlapped.

0109In the image compositing device according to claim 8 the invention concerning Claim 9 of this invention, While taking out the program and the transport stream packet (it is described as TSP below) on which program information was recorded which are viewed, listened to which or recorded from the transport stream (it is described as TS below) of digital broadcasting, By adding the fixed-length or variable-length number information which shows the number of TSP to cancel, or the number of TSP which is not canceled to the TSP to take out, The graphics screen information which the TSP filter means which outputs changed TS, and the above-mentioned graphics screen information creating means generate, While inserting in the TSP position canceled in TS changed from the above-mentioned TSP filter means, The TSP inserting means which corrects the above-mentioned number information to the number value of inserted TSP, and outputs it as changed TS, Changed TS which the above-mentioned TSP filter means or the above-mentioned TSP inserting means generates is inputted, TS reproduction means which only the number generates invalid TSP filled up with stuffing bytes, transposes these invalid TSP to the field to which number information is recorded, and carries out regeneration of TS from the number information of the changed TS, It is considered as the image compositing device which has a TSP extraction means generated by the above-mentioned TSP inserting means to take out TSP in which graphics screen information was stored from changed TS, and to reproduce graphic information. While changed TS in which the minimum data containing graphics screen information was stored by this is generable, While changed TS in which the minimum data that contains graphics screen information by reproducing graphics screen information from this changed TS, and being able to generate a graphics screen was stored is generable, By reproducing graphics screen information from this changed TS, a graphics screen is generable.

0110In the image compositing device according to claim 1, the invention concerning Claim 10 of this invention the above-mentioned multiplexer means, It is considered as the image compositing device performed by analog luminance signal Y, analog color difference signal R-Y and analog color difference signal B-Y or an analog R signal, the analog G signal, and an analog B signal. By this performing analog composition in the state where the subcarrier signal of the video signal of NTSC does not exist, in the analog composition by the above-mentioned multipress means, By the ability to compound without receiving the influence of the frequency error of the subcarrier of two signals, or phase contrast to compound, By performing analog composition in the state where the

subcarrier signal of the video signal of NTSC does not exist, It can compound without receiving the influence of the frequency deviation of the subcarrier of two signals, or phase contrast to compound, and can stop that the color reproduction nature of the video signal after composition falls compared with composition with a composite video signal.

0111It is made for the invention concerning Claim 11 of this invention to output the enable signal which shows whether the above-mentioned graphics operation means is an effective area of the graphics screen of the 2nd image in the image compositing device according to any one of claims 1 to 7. Thereby, the above-mentioned enable signal can be used for composition by the multiplexer of a graphics screen signal and a video signal.

Field of the InventionAbout an image compositing device, especially this invention generates a graphics screen signal, and relates to a video signal and the image compositing device to compound.

Description of the Prior ArtThe mixing process of a video signal and the graphics signal is carried out, and the lineblock diagram of the conventional image compositing device displayed on a Television Sub-Division television on a plane is shown in drawing 30. Drawing 30 is a block diagram of the subscriber cable box apparatus which exists within the enclosure of the member to whom interactive mode video processing is given indicated to the "video graphics device for televisions" of JP,H9-163259,A.

0003RF baseband converter 920 in a subscriber cable box apparatus, RF Television Sub-Division channel signaling is received, and the baseband composition video output signal 924 which changed this RF Television Sub-Division channel signaling into baseband frequency from that multiplexed channel frequency, and was acquired by changing is outputted.

0004The converter control system 922 lets the cable 927 pass from this central office towards the central office of a remote cable company, Permission and an access control signal are received and/or transmitted, baseband video scrambling or descrambling is operated, and a message is made on a screen display (OSD). In order that the converter control system 922 may choose required channel programming, It lets the bus 929 pass and a control signal is outputted to RF baseband converter 920, it lets the leads 931 and 933 pass to the serial interface processor 930, and various control signals and decipherment data signals are outputted to it.

0005It is programmable to CPU936, for example, ROM934 is EPROM. RAM935 is used as scratch-pad memory for CPU936. The graphics memory 938 is a memory which memorizes the sprite data about graphics and a video picture.

0006From the bus 924, the decoding device 944 to a YUV circuit receives a baseband synthetic video video signal, and outputs the YUV video signal acquired as a result to the memory controller and the sprite state machine 942 on the bus 943.

0007It let the data bus 939 pass, and connected with the graphics memory 938, and the memory controller and the sprite state machine 942 are connected to the video processing circuit 946 by the data bus 945. A memory controller and the sprite state machine 942 access the table of the graphics memory 938 in the order defined beforehand, in order to assemble and display each graphics beyond one or it on the position in the horizontal scanning line on the screen of a television receiver defined beforehand.

0008The video processing circuit 946 lets the data bus 945 pass, receives the video signal from a memory controller and the sprite state machine 942, and outputs NTSC or a PAL standard video signal to a remote television receiver (not shown).

Effect of the InventionAs mentioned above, while according to the invention concerning Claim 1 of this invention inputting the 1st video signal, and compounding a graphics screen signal to this or generating the graphics screen signal of the 2nd image, A graphics operation means to output the

graphics switch signal which directs the change of this graphics screen signal, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, The graphics switch signal from the above-mentioned graphics operation means, The 2nd video signal of the above is inputted and it is considered as the image compositing device which has a multiplexer means to compound the above-mentioned graphics screen signal and the 2nd video signal of the above with an analog signal by the multiplexer using the above-mentioned graphics switch signal. By this an above-mentioned graphics operation means to compound a graphics screen on the 1st image, With the detection synchronized signal of the 2nd video signal inputted via the above-mentioned switching means, generate the graphics screen signal compounded to the 2nd video signal, and the above-mentioned multiplexer means, By compounding the graphics screen signal and the 2nd image which are compounded on the 2nd image with an analog signal, Regardless of the kind whether the selected video signal is an analog or it is digital, to the video signal chosen from two or more video signals, Since a graphics screen signal or the signal with which it was superimposed on graphics screen information can be generated only in one graphics operation part and it can compound with a video signal, While being able to aim at the cost cut of a device, the graphics screen of a comfortable image unified into the televiewer to each video signal can be provided.

0102The graphics operation means which according to the invention concerning Claim 2 of this invention the 1st video signal is inputted, and a graphics screen signal is compounded, or can generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, The graphics switch signal from the above-mentioned graphics operation means, The 2nd video signal of the above is inputted and it is considered as the image compositing device which has a multiplexer means to compound the above-mentioned graphics screen signal and the 2nd video signal of the above with an analog signal by the multiplexer using the above-mentioned graphics switch signal. By this an above-mentioned graphics operation means to compound a graphics screen signal on the 1st image, With the detection synchronized signal of the 2nd video signal inputted via the above-mentioned switching means, generate the graphics screen signal compounded to the 2nd video signal, and the above-mentioned multiplexer means, By compounding the graphics screen signal and the 2nd image which are compounded to the 2nd video signal with a digital signal, To one video signal chosen from two or more video signals, regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen is generated only in one graphics operation part, and an image and this graphics screen can be compounded.

0103The graphics operation means which according to the invention concerning Claim 3 of this invention the 1st video signal is inputted, and a graphics screen signal is compounded, or can generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input the detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform the expanding processing and the reducing process of an image, The graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, It is considered as the image compositing device which has a multiplexer means to compound the 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal with an analog signal by the multiplexer using the above-mentioned graphics switch signal. By this an above-mentioned graphics operation means to compound a graphics screen signal on the 1st image, With the detection synchronized signal of the 2nd video signal inputted via the

above-mentioned switching means, generate the graphics screen signal compounded to the 2nd video signal, and the above-mentioned scaling means, Expand or reduce, output the 2nd image and the above-mentioned multiplexer means, By compounding the graphics screen signal compounded to the 2nd video signal, and the 2nd video signal after scaling with an analog signal, To one video signal chosen from two or more video signals. **whether the selected video signal is an analog and** While being able to generate a graphics screen only in one graphics operation part and being able to compound an image and this graphics screen regardless of the kind whether to be digital, It can arrange and an image and the character shown in the graphics screen can be arranged so that it may not lap, and it can be prevented from an image hiding under a character and disappearing.

0104The graphics operation means which according to the invention concerning Claim 4 of this invention the 1st video signal is inputted, and a graphics screen signal is compounded, or can generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input the detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform the expanding processing and the reducing process of an image, The graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, It is considered as the image compositing device which has a multiplexer means to compound the 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal with a digital signal by the multiplexer using the above-mentioned graphics switch signal. By this an above-mentioned graphics operation means to compound a graphics screen signal on the 1st image, With the detection synchronized signal of the 2nd video signal inputted via the above-mentioned switching means, generate the graphics screen signal compounded to the 2nd video signal, and the above-mentioned scaling means, Expand or reduce, output the 2nd image and the above-mentioned multiplexer means, By compounding the graphics screen signal compounded to the 2nd video signal, and the 2nd video signal after scaling with a digital signal, To one video signal chosen from two or more video signals. **whether the selected video signal is an analog and** While being able to generate a graphics screen only in one graphics operation part and being able to compound an image and this graphics screen regardless of the kind whether to be digital, It can arrange and an image and the character shown in the graphics screen can be arranged so that it may not lap, and it can be prevented from an image hiding under a character and disappearing.

0105. whether the invention concerning Claim 5 of this invention inputs the 1st video signal, and compounds a graphics screen signal, and With or the condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in generating the graphics screen signal of the 2nd image. If it is shown that the graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, The graphics operation means which makes possible what the graphics screen signal of the 2nd image is not generated for, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, It is considered as the image compositing device which has a multiplexer means to compound the 2nd video signal of the above with an analog signal by the multiplexer using the above-mentioned graphics switch signal. By this, in generating the graphics screen signal of the 2nd image, . **whether the 2nd video signal is a video signal which can compound a graphics screen like the standard signal by broadcast reception of a tuner, etc., and** With or the condition signal whether to be a special reproduction signal of an analog tape with VTR, and to be a video signal which cannot compound a graphics screen like the non-standard signal with which a synchronization pulse is not amended. When the above-mentioned condition signal shows that composition of a graphics screen is possible, Generate the graphics screen signal of the 2nd

image and the above-mentioned multiplexer means, The graphics screen signal and the 2nd analog video signal of the above which are compounded to the 2nd video signal are compounded, When the above-mentioned condition signal shows that composition of a graphics screen is impossible, By making it not generate the graphics screen signal of the 2nd image, the above-mentioned graphics operation means, Regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen is generated only in one graphics operation part based on a condition signal to one video signal chosen from two or more video signals, An image and this graphics screen are compoundable.

0106. whether the invention concerning Claim 6 of this invention inputs the 1st video signal, and compounds a graphics screen signal, and With or the condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in generating the graphics screen signal of the 2nd image. If it is shown that the graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, The graphics operation means which makes it possible not to generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, It is considered as the image compositing device which has a multiplexer means to compound the 2nd video signal of the above with a digital signal by the multiplexer using the above-mentioned graphics switch signal. By this, in generating the graphics screen signal of the 2nd image, . **whether the 2nd video signal is a video signal which can compound a graphics screen like the standard signal by broadcast reception of a tuner, etc., and** With or the condition signal whether to be a special reproduction signal of an analog tape with VTR, and to be a video signal which cannot compound a graphics screen like the non-standard signal with which a synchronization pulse is not amended. When the above-mentioned condition signal shows that composition of a graphics screen is possible, Generate the graphics screen signal of the 2nd image and the above-mentioned multiplexer means, The graphics screen signal and the 2nd digital video signal of the above which are compounded to the 2nd video signal are compounded, When the above-mentioned condition signal shows that composition of a graphics screen is impossible, By not generating the graphics screen signal of the 2nd image, the above-mentioned graphics operation means, Regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen is generated only in one graphics operation part based on a condition signal to one video signal chosen from two or more video signals, An image and this graphics screen are compoundable.

0107In the image compositing device according to any one of claims 1 to 6, the invention concerning Claim 7 of this invention the above-mentioned graphics operation means, About significant figures, such as a character in a graphics screen, or a sign, It is considered as the image compositing device which has a scaling information recording device for performing expansion of those other than a significant figure section, or reduction, and a graphics scaling means to perform expansion of a graphics screen, or reduction using the scaling information of the above-mentioned scaling information recording device. By this the above-mentioned graphics scaling means in the above-mentioned graphics operation means, In performing expansion and reduction of a graphics screen, By setting the horizontal line and vertical pixel row in which the significant figure of a graphics screen does not exist as the object of expanding processing or a reducing process using the information on a scaling information recording device, The selected video signal regardless of the kind whether to be an analog or to be digital, to one video signal chosen from two or more video signals only in one graphics operation part. A graphics screen can be generated and the image compositing device which can compound an image and this graphics screen can be obtained.

0108The graphics screen information creating means which generates the graphics screen information which superimposes the invention concerning Claim 8 of this invention on the non-usual picture area field of a video signal, If the difference of the time described in the part and the time which a display or VTR has is less than constant value when the above-mentioned graphics

screen information exists in the non-usual picture area field of the above-mentioned video signal, It is considered as the image compositing device which has a graphics screen reproduction means which superimposes the graphics screen signal based on graphics screen information in a usual picture area field. While this displays with a display the video signal with which the graphics screen signal was compounded, even if it is a case where it records on VTR, It is not necessary to generate two, the image for the display by which the graphics screen was compounded, and the image for the recording by which the graphics screen is not compounded. The 1st graphics screen information only with one image on which the non-usual picture area field was overlapped. As opposed to one video signal chosen from the video signal of two or more numbers by the ability to use for a display and recording, Regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen and graphics screen information are generable only in one graphics operation part. Even if it is a case where it records on VTR, displaying with a display the video signal with which the graphics screen was compounded, It is not necessary to generate two, the image by which the graphics screen for a display was compounded, and the image by which the graphics screen for recording is not compounded, and graphics screen information available to both a display and recording can generate the image on which the non-usual picture area field was overlapped.

0109In the image compositing device according to claim 8 the invention concerning Claim 9 of this invention, While taking out the program and the transport stream packet (it is described as TSP below) on which program information was recorded which are viewed, listened to which or recorded from the transport stream (it is described as TS below) of digital broadcasting, By adding the fixed-length or variable-length number information which shows the number of TSP to cancel, or the number of TSP which is not canceled to the TSP to take out, The graphics screen information which the TSP filter means which outputs changed TS, and the above-mentioned graphics screen information creating means generate, While inserting in the TSP position canceled in TS changed from the above-mentioned TSP filter means, The TSP inserting means which corrects the above-mentioned number information to the number value of inserted TSP, and outputs it as changed TS, Changed TS which the above-mentioned TSP filter means or the above-mentioned TSP inserting means generates is inputted, TS reproduction means which only the number generates invalid TSP filled up with stuffing bytes, transposes these invalid TSP to the field to which number information is recorded, and carries out regeneration of TS from the number information of the changed TS, It is considered as the image compositing device which has a TSP extraction means generated by the above-mentioned TSP inserting means to take out TSP in which graphics screen information was stored from changed TS, and to reproduce graphic information. While changed TS in which the minimum data containing graphics screen information was stored by this is generable, While changed TS in which the minimum data that contains graphics screen information by reproducing graphics screen information from this changed TS, and being able to generate a graphics screen was stored is generable, By reproducing graphics screen information from this changed TS, a graphics screen is generable.

0110In the image compositing device according to claim 1, the invention concerning Claim 10 of this invention the above-mentioned multiplexer means, It is considered as the image compositing device performed by analog luminance signal Y, analog color difference signal R-Y and analog color difference signal B-Y or an analog R signal, the analog G signal, and an analog B signal. By this performing analog composition in the state where the subcarrier signal of the video signal of NTSC does not exist, in the analog composition by the above-mentioned multipress means, By the ability to compound without receiving the influence of the frequency error of the subcarrier of two signals, or phase contrast to compound, By performing analog composition in the state where the subcarrier signal of the video signal of NTSC does not exist, It can compound without receiving the influence of the frequency deviation of the subcarrier of two signals, or phase contrast to compound, and can stop that the color reproduction nature of the video signal after composition falls compared with composition with a composite video signal.

0111It is made for the invention concerning Claim 11 of this invention to output the enable signal which shows whether the above-mentioned graphics operation means is an effective area of the graphics screen of the 2nd image in the image compositing device according to any one of claims 1 to 7. Thereby, the above-mentioned enable signal can be used for composition by the multiplexer of a graphics screen signal and a video signal.

Problem(s) to be Solved by the Invention However, the image compositing device which is a video graphics device for televisions shown in the above-mentioned conventional example has the composition by which a graphics screen is compounded only to one kind of video signal, and such a device has the following SUBJECT points.

1) One video signal is chosen from two or more video signals, and it does not have the composition which compounds a graphics screen to the selected video signal.

2) When the kinds of two or more above-mentioned video signals differ especially, one is a video signal by digital-broadcasting reception, for example, When another is the analog video signal reproduced with analog VTR, in the device 999 which combined the conventional device like drawing 31, digital composition of the graphics screen for digital-broadcasting received images is carried out, for example, but. An analog video signal will be compounded in the graphics operation part which the VTR part had conventionally. Two graphics operation parts will exist as the whole device, and this will cause a cost hike. The images of two graphics screens differ and it also becomes giving a televiewer sense of incongruity.

0010 Therefore, in the image compositing device in such a case, The selected video signal regardless of the kind whether to be an analog or to be digital, to one video signal chosen from two or more video signals only in one graphics operation part. A graphics screen signal or the signal with which it was superimposed on graphics screen information is generated, and to compound with a video signal is demanded.

0011 Then, this invention is only one graphics operation part regardless of whether that selected video signal is an analog to one video signal chosen from two or more video signals, or it is digital, A graphics screen signal or the signal with which it was superimposed on graphics screen information is generated, and it aims at providing the image compositing device which can compound this with a video signal.

Means for Solving the Problem In order to solve this SUBJECT, an invention concerning Claim 1 of this invention, While inputting the 1st video signal, and compounding a graphics screen signal to this or generating a graphics screen signal of the 2nd image, A graphics operation means to output a graphics switch signal which directs a change of this graphics screen signal, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and a graphics screen signal from the above-mentioned graphics operation means, A graphics switch signal from the above-mentioned graphics operation means, The 2nd video signal of the above is inputted and it is considered as an image compositing device which has a multiplexer means to compound the above-mentioned graphics screen signal and the 2nd video signal of the above with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

0013 A graphics operation means which an invention concerning Claim 2 of this invention inputs the 1st video signal, and a graphics screen signal is compounded, or can generate a graphics screen signal of the 2nd image, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and a graphics screen signal from the above-mentioned graphics operation means, A graphics switch signal from the above-mentioned graphics operation means, The 2nd video signal of the above is inputted and it is considered as an image compositing device which has a multiplexer means to compound the above-mentioned graphics screen signal and the 2nd video signal of the above with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

0014 A graphics operation means which an invention concerning Claim 3 of this invention inputs

the 1st video signal, and a graphics screen signal is compounded, or can generate a graphics screen signal of the 2nd image, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input a detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform expanding processing and a reducing process of an image, A graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, It is considered as an image compositing device which has a multiplexer means to compound the 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

0015A graphics operation means which an invention concerning Claim 4 of this invention inputs the 1st video signal, and a graphics screen signal is compounded, or can generate a graphics screen signal of the 2nd image, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input a detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform expanding processing and a reducing process of an image, A graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, It is considered as an image compositing device which has a multiplexer means to compound the 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal with a digital signal by a multiplexer using the above-mentioned graphics switch signal.

0016. whether an invention concerning Claim 5 of this invention inputs the 1st video signal, and compounds a graphics screen signal, and With or a condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in generating a graphics screen signal of the 2nd image. If it is shown that a graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, A graphics operation means which makes possible what a graphics screen signal of the 2nd image is not generated for, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and a graphics screen signal from the above-mentioned graphics operation means, It is considered as an image compositing device which has a multiplexer means to compound the 2nd video signal of the above with an analog signal by a multiplexer using the above-mentioned graphics switch signal.

0017. whether an invention concerning Claim 6 of this invention inputs the 1st video signal, and compounds a graphics screen signal, and With or a condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in generating a graphics screen signal of the 2nd image. If it is shown that a graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, A graphics operation means which makes possible what a graphics screen signal of the 2nd image is not generated for, A synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, A detection synchronized signal of a synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, A switching means which outputs one synchronized signal chosen, and a graphics screen signal from the above-mentioned graphics operation means, It is considered as an image compositing device which has a multiplexer means to compound the 2nd video signal of the above with a digital signal by a multiplexer using the above-mentioned graphics switch signal.

0018In the image compositing device according to any one of claims 1 to 6, an invention

concerning Claim 7 of this invention the above-mentioned graphics operation means, About significant figures, such as a character in a graphics screen, or a sign, It is considered as an image compositing device which has a scaling information recording device for performing expansion of those other than a significant figure section, or reduction, and a graphics scaling means to perform expansion of a graphics screen, or reduction using scaling information of the above-mentioned scaling information recording device.

0019A graphics screen information creating means which generates graphics screen information which superimposes an invention concerning Claim 8 of this invention on a non-usual picture area field of a video signal, If a difference of time described in the part and time which a display or VTR has is less than constant value when the above-mentioned graphics screen information exists in a non-usual picture area field of the above-mentioned video signal, It is considered as an image compositing device which has a graphics screen reproduction means which superimposes a graphics screen signal based on graphics screen information in a usual picture area field.

0020In the image compositing device according to claim 8 an invention concerning Claim 9 of this invention, While taking out a program and a transport stream packet (it is described as TSP below) on which program information was recorded which are viewed, listened to which or recorded from a transport stream (it is described as TS below) of digital broadcasting, By adding fixed-length or variable-length number information which shows the number of TSP to cancel, or the number of TSP which is not canceled to the TSP to take out, Graphics screen information which a TSP filter means which outputs changed TS, and the above-mentioned graphics screen information creating means generate, While inserting in a TSP position canceled in TS changed from the above-mentioned TSP filter means, A TSP inserting means which corrects the above-mentioned number information to a number value of inserted TSP, and outputs it as changed TS, Changed TS which the above-mentioned TSP filter means or the above-mentioned TSP inserting means generates is inputted, TS reproduction means which only the number generates invalid TSP filled up with stuffing bytes, transposes these invalid TSP to a field to which number information is recorded, and carries out regeneration of TS from number information of the changed TS, It is considered as an image compositing device which has a TSP extraction means generated by the above-mentioned TSP inserting means to take out TSP in which graphics screen information was stored from changed TS, and to reproduce graphic information.

0021In the image compositing device according to claim 1, an invention concerning Claim 10 of this invention the above-mentioned multiplexer means, It is considered as an image compositing device performed by analog luminance signal Y, analog color difference signal R-Y and analog color difference signal B-Y or an analog R signal, analog G signal, and an analog B signal.

0022It is made for an invention concerning Claim 11 of this invention to output an enable signal which shows whether the above-mentioned graphics operation means is an effective area of a graphics screen of the 2nd image in the image compositing device according to any one of claims 1 to 7.

0023

Embodiment of the Invention(Embodiment 1) Below, the embodiment of the invention 1 corresponding to Claim 1 and Claim 2 of this invention is described using drawing 4 from drawing 1. Drawing 1 is a lineblock diagram of the image compositing device by this Embodiment 1, and explains the operation. in drawing 1 -- 1 -- a graphics operation part and 2 -- a memory and 3 -- a change machine and 5, an NTSC decoder and 7, a memory data processing part and 4 are displays, and, as for a multiplexer and 8, a synchronizing detection part and 6 explain **TV encoder and 9** operation below.

0024When displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9 and it is necessary to compound a graphics screen on a digital-broadcasting image, The graphics operation part 1 compounds the graphics picture data read from the above-mentioned memory 2 to a digital-broadcasting received image, and outputs to it to the multiplexer 7.

0025The memory data processing part 3 synchronizes with the synchronized signal of a digital-broadcasting received image inputted from the change machine 4 by which switching control is carried out with a microcomputer etc. at this time, The graphics picture data which exists in the above-mentioned memory 2 is read, and it compounds to the digital-broadcasting received image into which this is inputted, and outputs to the multiplexer 7.

0026The memory data processing part 3 outputs switch signal SW1, as the multiplexer 7 outputs

the digital video signal with which the graphics screen from this memory data processing part 3 was compounded. The multiplexer 7 is changed according to switch signal SW1, and outputs the digital video signal with which the graphics screen was compounded to the TV encoder 8. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted.

0027When displaying an analog broadcasting received image like NTSC on the display 9 and it is necessary to compound a graphics screen to an analog broadcasting received image on the other hand, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog broadcasting received images based on ITUR601 which is advice of the Digital Video signal, for example, and outputs to the multiplexer 7. The example of the graphics screen for analog broadcasting received images which the graphics operation part 1 generates is shown in drawing 2.

0028At this time, the synchronizing detection part 5 detects a synchronized signal from the analog broadcasting received image inputted, and outputs to the memory data processing part 3 via the change machine 4. The memory data processing part 3 reads the graphics picture data which exists in the memory 2 synchronizing with the synchronized signal of an analog broadcasting received image inputted, and outputs it to the multiplexer 7, and. Switch signal SW2 which shows whether effective graphics picture data is outputted to the multiplexer 7 is outputted to the multiplexer 7. This switch signal SW2 is an enable signal of a graphics screen, for example, the pixel in which a certain characteristic value exists among the picture element data of the graphics screen currently recorded on the memory 2 is a signal which shows that it is not picture element data of an effective graphics screen. The relation between the graphics screen of drawing 2 and switch signal SW2 when the specimen of the one line is carried out on this graphics screen is shown in drawing 3.

0029NTSC decoder 6 digitizes an analog broadcasting received image based on ITUR601, and outputs it to the multiplexer 7. By changing according to switch signal SW2 which the memory data processing part 3 generates, the multiplexer 7 generates the digital video signal with which the graphics screen was compounded, and outputs this to the TV encoder 8. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted. The example of the image with which the graphics screen was compounded by the analog broadcasting received image is shown in drawing 4.

0030By the way, the amount T1 of process delay of the graphics operation part 1 to the synchronized signal of an analog broadcasting received image, When the delaying amounts T2 of NTSC decoding of NTSC decoder 6 to the synchronized signal of an analog broadcasting received image differ, in the case of $T1 > T2$, By the processing process of NTSC decoder 6, what is necessary is just to perform delay adjustment of $(T1 - T2)$, and in the case of $T1 < T2$, A process delay difference can be easily compensated by what is necessary's being just to perform delay adjustment of $(T2 - T1)$ by the processing process of the graphics operation part 1, and delaying a synchronized signal, for example, since these delay is constant etc.

0031In this Embodiment 1, although composition of the graphics screen by the multiplexer 7 was performed to the digital signal, it may compound by carrying out the multiplexer of the analog signal. In this case, for example, if an analog broadcasting video signal is a composite video signal, The graphics screen of the signal which decoded this to analog luminance signal Y and analog color difference signal R-Y, and analog color difference signal B-Y, analog luminance signal **which the graphics operation part 1 generates** Y and analog color difference signal R-Y, and analog color difference signal B-Y is compounded. Thus, by performing analog composition in the state where the subcarrier signal of the video signal of NTSC does not exist, It can compound without receiving the influence of the frequency deviation of the subcarrier of two signals, or phase contrast to compound, and can stop that the color reproduction nature of the video signal after composition falls compared with composition with a composite video signal.

0032Thus, in the image compositing device by this Embodiment 1, While inputting the 1st video signal, and compounding a graphics screen signal to this or generating the graphics screen signal of the 2nd image, A graphics operation means to output the graphics switch signal which directs the change of this graphics screen signal, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from this 2nd video signal, The synchronized signal of the 1st video signal and the detection synchronized signal of the 2nd video signal that the

above-mentioned synchronous detection means detects are inputted, The synchronized signal switching means which outputs one synchronized signal, and the signal or graphics screen signal with which it was superimposed on the graphics screen information from the above-mentioned graphics operation means, The graphics switch signal from the above-mentioned graphics operation means, The signal or graphics screen signal which inputted the 2nd video signal of the above and with which it was superimposed on the above-mentioned graphics screen information, By having had a multiplexer means to compound the 2nd video signal of the above with an analog signal or a digital signal by the multiplexer using the above-mentioned graphics switch signal, Regardless of the kind whether the selected video signal is an analog or it is digital, to one video signal chosen from two video signals, A graphics screen can be generated only in one graphics operation part, and the image compositing device which can compound an image and this graphics screen can be obtained.

0033(Embodiment 2) The embodiment of the invention 2 corresponding to Claim 3 and Claim 4 of this invention is hereafter described using drawing 9 from drawing 5. Drawing 5 is a lineblock diagram of the image compositing device by this Embodiment 2, and explains the operation. In drawing 5, a graphics operation part and 2 change 1, a memory data processing part and 4 change a memory and 3, a synchronizing detection part and 6, a multiplexer and 8, a vessel and 5 are scaling parts and, as for TV encoder and 9, an NTSC decoder and 7 explain **a display and 210** operation below.

0034Since operation of an about is the same as that of the case of the above-mentioned Embodiment 1 when displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9, and it is necessary to compound a graphics screen to a digital-broadcasting received image, explanation is omitted.

0035When displaying an analog broadcasting received image like NTSC on the display 9 and it is necessary to compound a graphics screen to an analog broadcasting received image on the other hand, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog broadcasting received images based on ITUR601 which is advice of the Digital Video signal, for example, and outputs to the multiplexer 7. The example of the graphics screen for analog broadcasting received images which the graphics operation part 1 generates is shown in drawing 6.

0036At this time, the synchronizing detection part 5 detects a synchronized signal from the analog broadcasting received image inputted, and outputs to the memory data processing part 3 via the change machine 4. While the memory data processing part 3 reads the graphics picture data which exists in the memory 1 synchronizing with the synchronized signal of an analog broadcasting received image inputted and outputs it to the multiplexer 7, Switch signal SW2 which shows whether effective graphics picture data is outputted to the multiplexer 7 is outputted to the multiplexer 7. This switch signal SW2 is an enable signal of a graphics screen, for example, the pixel in which a certain characteristic value exists among the picture element data of the graphics screen currently recorded on the memory 2 is a signal which shows that it is not picture element data of effective graphics. The relation between the graphics screen of drawing 6 and switch signal SW2 when the specimen of the one line is carried out on this graphics screen is shown in drawing 7.

0037NTSC decoder 6 digitizes an analog broadcasting received image based on ITUR601 format, and outputs it to the scaling part 210. The scaling part 210 changes the screen size of the digitized analog broadcasting received image by scaling processing, and outputs it to the multiplexer 7 synchronizing with the detection synchronized signal inputted from the above-mentioned synchronizing detection part 5.

0038Processing generally known is performed in the scaling part 210. For example, the video memory which has a dual port for buffering of digital video is used, the object for the writing of a digital video data and another port read, and one port serves as business. When changing the screen size of an image, at the time of screen reduction, just before writing in video memory, infanticide of cutoff of a writing area, a pixel, or a line is performed, and after being read from video memory, pixel interpolation and line interpolation are performed at the time of screen expansion. The example of the screen of the image performed to drawing 8 by the scaling part 210 and the screen of the image after reduction scaling was carried out is shown.

0039By changing according to switch signal SW2 which the memory data processing part 3

generates, the multiplexer 7 generates the digital video signal with which the graphics screen was compounded, and outputs this to the TV encoder 8.

0040The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted. The example of the image with which the graphics screen was compounded by the analog broadcasting received image by which scaling was carried out to drawing 9 is shown.

0041By the way, the amount T201 of process delay of the graphics operation part 1 to the synchronized signal of an analog broadcasting received image, In the case where the delaying amounts T202 of the NTSC decoder processing of NTSC decoder 6 to the synchronized signal of an analog broadcasting received image and processing of the scaling part 210 differ, In the case of $T201 > T202$, by the processing process of NTSC decoder 6 or the scaling part 210. What is necessary is just to perform delay adjustment of $(T201 - T202)$, and in the case of $T201 < T202$, By what is necessary being just to perform delay adjustment of $(T202 - T201)$ by the processing process of the graphics operation part 1, since these delay is constant, it can compensate a process delay difference easily, for example by delaying a synchronized signal etc.

0042Thus, in the image compositing device by this Embodiment 2, The graphics operation means which the invention concerning Claim 3 of this invention inputs the 1st video signal, and a graphics screen signal is compounded, or can generate the graphics screen signal of the 2nd image, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the 2nd video signal, A scaling means to input the detection synchronized signal which the above-mentioned synchronous detection means outputs, and to perform the expanding processing and the reducing process of an image, The graphics screen signal from the above-mentioned graphics operation means and the 2nd video signal by which scaling was carried out from the above-mentioned scaling means are inputted, The 2nd video signal by which scaling was carried out **above-mentioned** to the above-mentioned graphics signal, As opposed to one video signal chosen from two video signals by having had a multiplexer means to compound with an analog signal or a digital signal by the multiplexer using the above-mentioned graphics switch signal, While being able to generate a graphics screen only in one graphics operation part and being able to compound an image and this graphics screen regardless of the kind whether the selected video signal is an analog or it is digital, It can arrange an image and the character shown in the graphics screen can be arranged so that it may not lap, and the image compositing device that an image will hide under a character and will disappear can be obtained.

0043(Embodiment 3) Below, Embodiment 3 corresponding to Claim 5 and Claim 6 of this invention is described using drawing 14 from drawing 10. Drawing 10 is a lineblock diagram of the image compositing device by this Embodiment 3, and explains the operation. In drawing 10, 1 a graphics operation part and 2 a memory and 4 A change machine, 305 -- an NTSC decoder and 7, TV encoder and 9, a synchronizing detection part and 6 are buffering parts, and, as for a display and 310, a multiplexer and 8 explain **a memory data processing part and 311** operation below.

0044Since operation of an about is the same as that of the case of the above-mentioned Embodiment 1 when displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9, and it is necessary to compound a graphics screen on a digital-broadcasting image, explanation is omitted. Here, the memory data processing part 310 by this Embodiment 3 carries out the same operation as the memory data processing part 3 by the above-mentioned Embodiment 1.

0045When displaying analog video like NTSC on the display 8 and it is necessary to compound a graphics screen to analog video on the other hand, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog video based on ITUR601 which is advice of the Digital Video signal, for example, and outputs to the multiplexer 7.

0046However, generation of the graphics screen for these analog video shall perform this depending on condition signal ST shown in drawing 10. This condition signal ST is what shows the signal state of analog video, When analog video is a standard signal like a broadcast received image (for example, suppose that the potential level of a condition signal is high-level), Generate

the graphics screen for analog video and, in the case of a non-standard signal like the special reproduction image of VTR (for example, the potential level of a condition signal considers it as a low level), Since a synchronized signal turns into a non-standard signal as shown in drawing 11 (a), it is a thing for making it like which does not generate the graphics screen for analog video. That is, this condition signal ST is a signal which shows the state of analog video which apparatus by which the image compositing device by this Embodiment 3 is incorporated, such as VTR, has, for example.

0047Even if the above-mentioned analog video signal is a non-standard signal with a natural thing, At the time of detection of the synchronized signal by the synchronizing detection part 5, by using PLL, The synchronized signal (shown in drawing 11 (b)) with which the missing synchronization pulse part was amended is generated, and if composition of a graphics screen is always performed normally by this, the above-mentioned condition signal ST will take the same state as a standard signal.

0048The graphics operation part 1 shows the example of a graphics screen in case generation of the graphics screen for analog video is performed to drawing 12. When generation of the graphics screen for analog video is performed by the graphics operation part 1, the synchronizing detection part 305 detects a synchronized signal from the analog video inputted, and outputs this to the memory data processing part 310 via the change machine 4.

0049While the memory data processing part 310 reads the graphics picture data which exists in the memory 2 synchronizing with the synchronized signal of analog video inputted and outputting to the multiplexer 7, Switch signal SW2 which shows whether effective graphics picture data is outputted to the multiplexer 7 is outputted to the multiplexer 7. This switch signal SW2 is an enable signal of a graphics screen, for example, the pixel in which a certain characteristic value exists among the picture element data of the graphics screen currently recorded on the memory 2 is a signal which shows that it is not picture element data of effective graphics. The relation between the graphics screen of drawing 12 and switch signal SW2 when the specimen of the one line is carried out on this graphics screen is shown in drawing 13.

0050NTSC decoder 6 digitizes an analog video signal based on ITUR601, and outputs it to the buffering part 311. The buffering part 311 buffers the digitized analog video temporarily, and it synchronizes with the detection synchronized signal from the synchronizing detection part 305 into which this is inputted to the graphics operation part 1, Or synchronizing with the synchronized signal which the graphics operation part 1 generated, it outputs to the multiplexer 7.

0051Processing generally known is performed in this buffering part 311. For example, for buffering of digital video, the video memory which has a dual port is used, the object for the writing of a digital video data and another port read, one port serves as business, and the reading and writing to a memory are performed according to the synchronized signal inputted.

0052By changing according to switch signal SW1 which the memory data processing part 3 generates, the multiplexer 7 generates the digital video by which the graphics screen was compounded, and outputs this to the TV encoder 8. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted. The example of the image with which the graphics screen was compounded by analog video is shown in drawing 14.

0053By the way, the amount T301 of process delay of the graphics operation part 1 to the synchronized signal of an analog broadcasting received image, In the case where the delaying amounts T302 of NTSC decoder processing of NTSC decoder 6 and processing of the buffering part 311 to the synchronized signal of an analog video signal differ, In the case of $T301 > T302$, by the processing process of NTSC decoder 6 or the buffering part 311. What is necessary is just to perform delay adjustment of $(T301 - T302)$, and in the case of $T301 < T302$, By what is necessary being just to perform delay adjustment of $(T302 - T301)$ by the processing process of the graphics operation part 1, since these delay is constant, it can compensate a process delay difference easily, for example by delaying a synchronized signal etc.

0054Thus, in the image compositing device by this Embodiment 3, With the condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in inputting the 1st video signal, and compounding a graphics screen signal or generating the graphics screen signal of the 2nd image. If it is shown that the graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is

shown that the above-mentioned condition signal can be compounded, The graphics operation means which makes possible what the graphics screen signal of the 2nd image is not generated for, The synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, The detection synchronized signal of the synchronized signal of the 1st video signal and the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, As opposed to one video signal chosen from two video signals by having had a multiplexer means to compound the 2nd video signal of the above with an analog signal or a digital signal by the multiplexer using the above-mentioned graphics switch signal, Regardless of the kind whether the selected video signal is an analog or it is digital, based on a condition signal, a graphics screen can be generated and the image compositing device which can compound an image and this graphics screen can be obtained only in one graphics operation part.

0055(Embodiment 4) Below, Embodiment 4 corresponding to Claim 7 of this invention is described using drawing 19 from drawing 15. Drawing 15 is a lineblock diagram of the image compositing device by this Embodiment 4, and explains the operation. In drawing 15, 1 a graphics operation part and 2 a memory and 4 A change machine, A synchronizing detection part and 6 for 5 an NTSC decoder and 7 a multiplexer and 8 TV encoder, 9 -- a display and 410 -- the scaling information Records Department and 412, a down converter and 414, a memory data processing part and 411 are the displays for NTSC, and, as for a multiplexer and 415, an up converter and 413 explain **TV encoder and 416** operation below.

0056Since operation of an about is the same as that of the case of the above-mentioned Embodiment 1 when displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9, and it is necessary to compound a graphics screen to a digital-broadcasting received image, explanation is omitted. Here, operation of the memory data processing part 410 by this Embodiment 3 carries out the same operation as the memory data processing part 3 by the above-mentioned Embodiment 1.

0057In the case where digital-broadcasting received images, such as digital HDTV, are displayed on the display 416 for NTSC, When it is necessary to compound a graphics screen to a digital-broadcasting received image, the graphics operation part 1 compounds a graphics screen to a digital-broadcasting received image, and outputs to the down converter 413. The memory data processing part 410 synchronizes with the synchronized signal of a digital-broadcasting received image inputted from the change machine 4 by which switching control is carried out with a microcomputer etc. at this time, The graphics picture data which exists in the memory 2 is read, and it compounds to the digital-broadcasting received image into which this is inputted, and outputs to the down converter 413.

0058The down converter 413 carries out the down convert of the digital HDTV image inputted to an NTSC image, and outputs it to the multiplexer 414. As the graphics operation part 1 outputs the signal from the down converter 413 to the multiplexer 414, it outputs switch signal SW1. The multiplexer 414 outputs the signal from the down converter 413, i.e., the digital-broadcasting received image by which the down convert was carried out to the image of NTSC, to NTSC encoder 415 according to switch signal SW1 which the graphics operation part 1 generates. The digital video signal inputted is changed into an analog signal, and NTSC encoder 415 outputs it to the display 416. The display 416 displays the image of the video signal inputted.

0059When displaying an analog broadcasting received image like NTSC on the display 9 for HDTV, in compounding a graphics screen to an analog broadcasting received image, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog broadcasting received images by the same screen format as HDTV, While outputting to the multiplexer 7, the synchronized signal of HDTV is outputted to the up converter 412. While the memory data processing part 410 reads the graphics picture data which exists in the memory 2 synchronizing with the synchronized signal of an analog broadcasting received image inputted and outputs it to the multiplexer 7 at this time, Switch signal SW2 which shows whether effective graphics picture data is outputted to the multiplexer 7 is outputted to the multiplexer 7.

0060NTSC decoder 6 digitizes an analog broadcasting received image based on ITUR601 format, and outputs it to the up converter 412. The up converter 412 changes the digitized analog

broadcasting received image into the screen size of HDTV, and outputs the image which carried out upconverting of NTSC to the multiplexer 7 synchronizing with the synchronized signal of the above-mentioned HDTV from the graphics operation part 1.

0061By changing according to the switch signal which the memory data processing part 410 generates, the multiplexer 7 generates the digital-broadcasting received image by which the graphics screen was compounded, and outputs this to the TV encoder 8. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted.

0062By the way, the delaying amount T401 of processing of NTSC decoder 6 and the up converter 411 to the synchronized signal of an analog broadcasting received image, When the delaying amounts T402 of processing of the graphics operation part 401 to the synchronized signal of an analog broadcasting received image differ, in the case of $T401 > T402$, By the processing process of NTSC decoder 6 or the up converter 412, what is necessary is just to perform delay adjustment of $(T401 - T402)$, and in the case of $T401 < T402$, A process delay difference can be easily compensated by what is necessary's being just to perform delay adjustment of $(T402 - T401)$ by the processing process of the graphics operation part 1, and delaying a synchronized signal, for example, since these delay is constant etc.

0063When displaying an analog broadcasting received image like NTSC on the display 416 for NTSC and it is necessary to compound a graphics screen on an analog broadcasting image, The graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images generates the graphics screen for analog broadcasting images. The example of the graphics screen of HDTV screen size is shown in drawing 16.

0064At this time, the memory data processing part 410 generates the graphics screen for analog broadcasting images based on the information of the scaling information Records Department 411 by carrying out a down convert from the graphics screen of HDTV size to the graphics screen of NTSC size. The usual picture area field of HDTV size For example, **per frame, 1920 pixels wide** , When it is the length of 1080 lines and the usual picture area field of NTSC size carries out the down convert of this to the screen size which are 720 pixels wide and the length of 480 lines per frame, Although it is necessary to cancel 1200 lines to a lengthwise direction and to cancel 600 lines in a transverse direction from the usual picture area field of HDTV size, for example, it is recorded on the scaling information Records Department 411 which lengthwise direction line and a transverse direction line are canceled. The information currently recorded on this scaling information Records Department 411, Are a total of binary 1080-bit 3000-bit information +1920-bit, and 1080 bits of the first half, It is shown one by one from the line of a usual picture area upper bed whether a transverse direction line should be canceled, 1920 bits of the second half show one by one whether a lengthwise direction line should be canceled from a usual picture area left end, and means that 1 cancels, and it means that zero do not cancel. For example, if the value of the beginning of the scaling information Records Department 411 is 1, it means canceling the upper bed side of one line of the usual picture area field of HDTV size. For example, if the 1081st value of the scaling information Records Department 411 is zero, it means not canceling left end length of one line of the usual picture area field of HDTV size.

0065The memory data processing part 410 acquires a pixel required for a down convert from the picture data of the HDTV size of the memory 2, referring to each of this value of a total of 3000 bits. At this time, the graphics screen which the memory data processing part 410 generates, Without canceling the pixel of the field in the memory 2 which constitutes a significant figure at least, It is the feature of this Embodiment 4 to be used, when the information which is acquired altogether, is generated and should be generated such is recorded on the scaling information Records Department 411 and scaling is performed. The figure which specified the portion thinned out in the graphics screen of HDTV screen size is shown in drawing 17. The example of the graphics screen of the NTSC screen size which the memory data processing part 3 thins out and outputs to drawing 18 with reference to the information of the scaling information Records Department is shown.

0066At this time, although the synchronizing detection part 5 will read graphics picture data from the memory 2 and will output the memory data processing part 410 to the down converter 413 synchronizing with the synchronized signal which is detected, is changed from an analog broadcasting received image, and is outputted via the vessel 4, About acquisition of a transverse

direction line, calculation of a cancellation line and position computation in the memory in which the next acquisition line exists are performed during the non-usual picture area field of one line. When the transverse direction line to cancel is continuing, although the gate time of the cancellation line increases in proportion to a cancellation line number, a bit value which the calculation ends during the non-usual picture area field of one line is recorded on the scaling information Records Department 411. For example, the period of one line of a non-usual picture area field is 10000 ns, If time for 1 calculation of the continuation cancellation line by bit information continuation read-out from the scaling information Records Department 411 to set up the acquisition line read from the memory 2 for 50 ns is 100 ns, Continuation line cancellation can be set up to 186 lines ($10000\text{ns}-100\text{ns}=9900\text{ns}$, $9900\text{ns}/50\text{ns} = 198$ lines). That is, although it means that 198 pieces may follow the scaling information Records Department 411, and zero may exist in it, 198 lines is not canceled continuously in practice, therefore continuation reading processing from a memory is performed smoothly.

0067In this way, although it is necessary to acquire the pixel which generates a graphics screen further out of all the pixels in read one line, About this, the FIFO memory for the pixel number per line of NTSC (for example, it is enough if it is by 858 pixels) is used, for example, Distinguish whether it inputs into the above-mentioned FIFO by beginning to read the bit information from the head of the scaling information Records Department 411 one by one, and investigating a value, when a value is 1, input, but. When a value is zero, while controlling not to input and beginning to read in a similar manner one by one by the following pulse of the above-mentioned detection synchronized signal further, The graphics screen of NTSC screen size is generable by repeating a series of operations of inputting the acquisition pixel of a succeeding line similarly. Thus, the memory data processing part 410, While outputting the graphics picture data acquired from the memory 2 to the multiplexer 414, switch signal SW1 which shows whether still more effective graphics picture data is outputted to the multiplexer 414, and SW2 are outputted to the multiplexer 414.

0068Synchronizing with the synchronized signal of an analog broadcasting received image into which the memory data processing part 3 is inputted as mentioned above, the graphics picture data which exists in the memory 2 is down-convert-outputted to the down converter 413 based on the information of the scaling information Records Department 411. The down converter 413 outputs the graphics screen already changed and inputted into the screen size of NTSC to the multiplexer 414 as it is.

0069NTSC decoder 6 digitizes an analog broadcasting received image based on ITUR601, and outputs it to the multiplexer 414. The multiplexer 414 is changed according to above-mentioned switch signal SW1 which the memory data processing part 410 generates, and SW2, and outputs the digital video signal with which the graphics screen was compounded to NTSC encoder 415. Switch signal SW1 which the memory data processing part 410 generates at this time, and SW2 are the signals that a graphics screen is compounded by the digitized analog broadcasting received image.

0070Therefore, the output of the multiplexer 414 serves as a digital signal with which the graphics screen was compounded by the analog broadcasting received image. The digital video signal inputted is changed into an analog signal, and NTSC encoder 415 outputs it to the display 416 for NTSC. The display 416 for NTSC displays the image of the video signal inputted. The example of the image with which the graphics screen was compounded by the analog broadcasting received image is shown in drawing 19.

0071By the way, the graphics operation part 1 to the synchronized signal of an analog broadcasting received image and the amount T403 of process delay of the down converter 413, When the delaying amounts T404 of processing of the NTSC decoder processing of NTSC decoder 6 to the synchronized signal of an analog broadcasting received image differ, in the case of $T403 > T404$, By the processing process of NTSC decoder 6, what is necessary is just to perform delay adjustment of $(T403-T404)$, and in the case of $T403 < T404$, A process delay difference can be easily compensated by what is necessary's being just to perform delay adjustment of $(T404-T403)$ by the processing process of the graphics operation part 1 and the down converter 413, and delaying a synchronized signal, for example, since these delay is constant etc.

0072Thus, in the image compositing device by this Embodiment 4, In the image compositing device by the above-mentioned Embodiments 1 thru/or 3, a graphics operation means, About

significant figures, such as a character in a graphics screen, or a sign, The scaling information recording device for performing expansion of those other than a significant figure section, or reduction, By having had a graphics scaling means to perform expansion of a graphics screen, or reduction using the scaling information of the above-mentioned scaling information recording device, With the condition signal which shows whether the 2nd video signal of the above is a signal which can compound a graphics screen in inputting the 1st video signal, and compounding a graphics screen signal or generating the graphics screen signal of the 2nd image. If it is shown that the graphics screen signal of the 2nd image cannot be generated and the above-mentioned condition signal cannot compound if it is shown that the above-mentioned condition signal can be compounded, The graphics operation means which makes possible what the graphics screen signal of the 2nd image is not generated for, the synchronous detection means which inputs the 2nd video signal and detects a synchronized signal from the 2nd video signal, and the synchronized signal of the 1st video signal, The detection synchronized signal of the 2nd video signal that the above-mentioned synchronous detection means detects is inputted, The switching means which outputs one synchronized signal chosen, and the graphics screen signal from the above-mentioned graphics operation means, By having had a multiplexer means to compound the 2nd video signal of the above with an analog signal or a digital signal by the multiplexer using the above-mentioned graphics switch signal, The selected video signal regardless of the kind whether to be an analog or to be digital, to one video signal chosen from two video signals only in one graphics operation part. A graphics screen can be generated and the image compositing device which can compound an image and this graphics screen can be obtained.

0073(Embodiment 5) Below, Embodiment 5 corresponding to Claim 8 of this invention is described using drawing 23 from drawing 20. Drawing 20 is a lineblock diagram of the image compositing device by this Embodiment 5. In drawing 20, 1 a graphics operation part and 2 a memory and 3 A memory data processing part, A change machine and 5 for 4 a synchronizing detection part and 6 an NTSC decoder and 7 A multiplexer, 8 -- a display and 510, a graphics screen information generation part and 512, TV encoder and 9 are change machines and, as for a graphics screen regenerating section and 513, VTR and 511 explain **a change machine and 514** operation below.

0074When displaying digital-broadcasting received images, such as satellite broadcasting, on the display 9 and it is necessary to compound a graphics screen to a digital-broadcasting received image, the graphics operation part 1 compounds a graphics screen to a digital-broadcasting received image, and outputs to the multiplexer 7.

0075The memory data processing part 3 synchronizes with the synchronized signal of a digital-broadcasting received image inputted from the change machine 4 by which switching control is carried out with a microcomputer etc. at this time, The graphics picture data which exists in the memory 2 is read, is compounded to the digital-broadcasting received image inputted, and it outputs to the graphics screen information generation part 511.

0076The graphics screen information generation part 511 changes switch signal SW3, and sends it to the vessel 513 so that the signal of the graphics screen information generation part 511 may be outputted to the change machine 513, As the memory data processing part 3 outputs the signal from the change machine 513, it outputs switch signal SW4 to the multiplexer 7.

0077The digital-broadcasting received image by which the graphics screen was compounded is outputted to the TV encoder 8 by changing the change machine 513 and the multiplexer 7 according to switch signal SW3 and SW4, respectively. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted.

0078By the way, in the case where an analog broadcasting received image like NTSC is recorded on VTR510, When it is necessary to compound a graphics screen on an analog broadcasting image, If the analog video by which the graphics screen for analog broadcasting images which the graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images by the above-mentioned processing generates was compounded is recorded, it will be recorded to the compounded graphics screen.

0079Then, in recording analog video, while the graphics screen information generation part 511 generates graphics screen information and outputs to the multiplexer 7 via the change machine 513, Synchronizing with the detection synchronized signal from a synchronizing detection part, switch signal SW5 for superimposing this graphics screen information on a non-usual picture area

field is outputted to the multiplexer 7.

0080The graphics screen information which the graphics screen information generation part 511 generates is the character code group which constitutes a graphics screen, a display position of these character codes, a foreground color, a background color, and generating time, for example. In the case of an NTSC image, as the amount of information superimposed on a non-usual picture area field, For example, it is superimposed on 40 lines per frame excluding the line for closed caption information superposition, and the line for CGMS-A information superposition including duplicate propriety information, and 64 bits per line as this graphics screen information. In this case, in a case so that it may be 64 bits **per frame / 40 lines** \times = 2560 bits = 320 bytes in amount of information and a character may be displayed on a graphics screen, As time information, or sexual desire news and attribution information, even if it occupies 200 bytes, for example, it becomes possible to assign remaining 120 bytes to text, and this is value sufficient as an amount of text per frame. To drawing 21, the example of a graphics screen and the information recorded on a non-usual picture area field are illustrated. The graphics screen in drawing 21 shows that it was generated at 13:05 on July 10, 1998, and supposes that character string "ABC" and character string "DEF" has an attribute in a figure, and is displayed.

0081The information on the graphics screen of drawing 21 recorded on a non-usual picture area field and a wave-like example are shown in drawing 22. By drawing 22, in order to make it intelligible, the case where 8 bits per line are superimposed is shown. In the bit string "1111010000001001" of drawing 22, 8 bits "11110100" of a head show "T" and 8 bits "00001001" of the second half show "9." Above, although the graphics information superimposed on a non-usual picture area field was explained as text, arbitrary information, including a sign, a figure, etc., may be sufficient as it.

0082An analog broadcasting received image is digitized by NTSC decoder 6, and is outputted to the multiplexer 7 via the change machine 514. The multiplexer 7 is changed according to switch signal SW6 which the graphics screen information generation part 511 generates, and outputs the digital video by which the graphics screen was compounded to the TV encoder 8. At this time, switch signal SW6 which the graphics screen information generation part 511 generates is the signal that the specific non-usual picture area field of the digitized analog broadcasting image is overlapped on graphics screen information. Therefore, the output of the multiplexer 7 serves as a digital signal with which the analog broadcasting received image was overlapped on graphics screen information.

0083The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to VTR510. VTR510 records the video signal inputted.

0084When the analog video signal with graphics screen information recorded as mentioned above is played, The graphics screen information of a non-usual picture area field is acquired, a graphics screen is reproduced from this graphics screen information, and with the change machine 514, the graphics screen regenerating section 512 carries out a multiplexer, and generates. This reproduction by PLL locked to a synchronized signal pulse generating the clock for taking out graphics screen information, and, for example, sampling it from the Horizontal Synchronizing signal of a video signal, using this, Bit information will be acquired and graphics screen information will be obtained further. A graphics screen can be obtained by developing the bit map of a graphics screen from this graphics screen information to the video memory in the graphics screen regenerating section 512, and reading graphics picture data from a memory according to a synchronized signal. As this memory, the memory 2 other than the memory which it has in graphics screen regenerating section 512 inside may be used by common use. And if this graphics screen is compounded synchronizing with the synchronized signal of a video signal, the image by which the graphics screen was compounded will be acquired.

0085At this time, the graphics screen regenerating section 512 outputs switch signal SW6 for superimposing that reproduction screen signal on a video signal to the change machine 514. This switch signal SW6 is an enable signal of a graphics screen, for example, the pixel in which a certain characteristic value exists among the picture element data of a graphics screen is a signal which shows that it is not picture element data of effective graphics.

0086The change machine 514 is changed according to switch signal SW6 which the graphics screen information generation part 511 generates, Outputting the digital video by which the graphics screen was compounded to the multiplexer 7, the multiplexer 7 outputs the digital video

by which the graphics screen was compounded to the TV encoder 8 as it is. The TV encoder 8 changes the digital video signal inputted into an analog signal, and outputs it to the display 9. The display 9 displays the image of the video signal inputted.

0087The image before a graphics screen is compounded by drawing 23, and the compounded image are illustrated. By the way, the generation and composition of a graphics screen with the above-mentioned graphics screen regenerating section 512 and the change machine 514, If a difference with the time which could also give display 9 inside and was recorded the present time and in the non-usual picture area field in this case is less than constant value (for example, less than 1 second), If a difference with the time which judged that a graphics screen should have been displayed, performed reproduction and composition of the graphics screen, and was recorded in the non-usual picture area field is beyond constant value (for example, 1 seconds or more), If it is playback from the tape already recorded on VTR, etc., it judges that it is not necessary to display a graphics screen promptly and it is made not to perform playback of a graphics screen, and composition, The image by which the graphics screen for a display was compounded, and the image by which the graphics screen for recording is not compounded, It is not necessary to generate two **, and it is only generating one video signal on which the non-usual picture area field was overlapped, and graphics screen information can use this now for both a display and recording. When a televiewer enables it to choose the display of a graphic screen, according to a televiewer's intention, the image by which the graphics screen was compounded, and the image which is not compounded are chosen and displayed, and it can view and listen to it.

0088The above-mentioned graphics information is the same method as the above as a thing corresponding to a digital-broadcasting received image, and may be superimposed by the non-usual picture area field of a digital-broadcasting received video signal.

0089In the case where an analog broadcasting received image like NTSC is displayed **in / with a natural thing / this Embodiment 5** on the display 9, for example when not recording on VTR, When it is necessary to compound a graphics screen to an analog broadcasting received image, As carried out by the above-mentioned Embodiment 1, the graphics operation part 1 which was generating the graphics screen for digital-broadcasting received images, The graphics screen for analog broadcasting received images is generated based on ITUR601 which is advice of the Digital Video signal, for example, and it may be made to compound with the analog broadcasting received image digitized by the multiplexer 7.

0090Thus, in the image compositing device by this Embodiment 5, The graphics screen information creating means which generates the graphics screen information superimposed on the non-usual picture area field of a video signal, If the difference of the time described in the part and the time which a display or VTR has is less than constant value when the above-mentioned graphics screen information exists in the non-usual picture area field of the above-mentioned video signal, By having had the graphics screen reproduction means which superimposes the graphics screen signal based on graphics screen information in a usual picture area field, Regardless of the kind whether the selected video signal is an analog or it is digital, a graphics screen and graphics screen information are generable only in one graphics operation part to one video signal chosen from the video signal of two numbers. Even if it is a case where it records on VTR, displaying with a display the video signal with which the graphics screen was compounded, The image by which the graphics screen for a display was compounded, and the image by which the graphics screen for recording is not compounded, It is not necessary to generate two and graphics screen information available to both a display and recording can provide the image compositing device which can generate the image on which the non-usual picture area field was overlapped.

0091In the above-mentioned Embodiments 1 thru/or 5, The selected video signal regardless of the kind whether to be an analog or to be digital, to one video signal chosen from two video signals only in one graphics operation part. The image compositing device which can compound a graphics screen and a video signal can be provided. The video signals which should be chosen **above-mentioned** with a natural thing may be three or more video signals.

0092(Embodiment 6) The portion the image compositing device by the embodiment of the invention 8 is indicated to be to drawing 24 at the image compositing device of the above-mentioned Embodiment 5 is added. In drawing 24, as for a TSP filter part and 611, a TSP regenerating section and 613 are TSP extract sections, and, as for 610, a TSP insert portion and 612 explain operation below.

0093The TSP filter part 610 is a transport stream (decided upon this by MPEG 2 standard system parts and ITU-T Rec H.222.0|ISO/IEC 13818-1.) of digital broadcasting, as shown in drawing 25. it is described as TS below. from, while taking out the transport stream packet (it is described as TSP below) on which the program and program information which are viewed, listened to which or recorded were recorded, Changed TS is outputted by adding the fixed-length or variable-length number information which shows the number of TSP to cancel, and the number of TSP which is not canceled to the TSP to take out.

0094. As the TSP insert portion 611 is shown in drawing 26, it can set to the above-mentioned Embodiment 5. The graphics screen information which the graphics screen information creating means 511 generates, According to an MPEG 2 standard, according to syntax, a definition is given, for example as one private data, and this is inserted in the TSP position canceled in TS changed from the above-mentioned TSP filter means, and is outputted as changed TS. At this time, it also performs correcting the above-mentioned number information with the number value of inserted TSP. Values other than the value which is already specified and is assigned are used for the value for identifying the data in TSP, such as PID and table ID, in insertion of TSP in which graphics screen information was stored. In the above-mentioned Embodiment 5, graphics screen information is considering it as 320 bytes, and at least two TSP is needed for storing this. Generally TSP of only the number which can store the amount of graphics screen information is generated, and it inserts in TS. It may be the head and the backmost part of TS which make the insertion point of this TSP the object of handling with the natural thing.

0095The TS regenerating section 612 inputs changed TS which the above-mentioned TSP filter means 610 or the above-mentioned TSP inserting means 611 generates, as shown in drawing 27, Regeneration of TS is carried out by only the number's generating invalid TSP filled up with stuffing bytes from the number information of the changed TS, and transposing these invalid TSP to the field to which number information is recorded.

0096The example of invalid TSP constituted according to the system parts of an MPEG 2 standard is shown in drawing 28. In drawing 28, in 1TSP which comprises 188 bytes, behind 4 bytes of head, The adaptation field which was 184 bytes continues, stuffing bytes are inserted in 182 bytes of back in the adaptation field, and invalid TSP is constituted. As shown in drawing 29, TSP extract section 613 takes out TSP in which graphics screen information was stored from changed TS which was generated by the above-mentioned TSP inserting means 611, and reproduces graphic information.

0097In the image compositing device by this Embodiment 6, While being able to record without making a record section useless by taking out only TSP required for record from TS efficiently, Since the number of canceled TSP is known also when reproducing it by the TSP regenerating section 612, TS which can use the hour entry in TSP called PCR effectively can be reproduced, and, for this reason, it can process normally also by inputting this reproduced TS into the device which processes TSP called a TS decoder, for example.

0098TSP in which graphics screen information was stored is inserted in TS, it can record now on an archive medium, this recorded TS can be reproduced, and a graphics screen can be compounded. TSP in which graphics screen information was stored with the natural thing may be generated as one or more independent TS. Graphics screen information may not be limited to a digital-broadcasting received image, and may be the graphics screen information for analog broadcasting received images.

0099Although unnecessary TSP was canceled, number information was added and the TSP insert portion 611 explained in the above as what inserts TSP at the TSP filter part 610, What is necessary is just to generate as another 1TS in which graphics screen information was stored about the handling of the graphics screen information of a case so that one TS may be recorded as it is, without canceling TSP.

0100Thus, in the image compositing device by this Embodiment 6, In the image compositing device by the above-mentioned Embodiment 5, from the transport stream (it is described as TS below) of digital broadcasting. While taking out the program and the transport stream packet (it is described as TSP below) on which program information was recorded which are viewed, listened to which or recorded, By adding the fixed-length or variable-length number information which shows the number of TSP to cancel, or the number of TSP which is not canceled to the TSP to take out, The graphics screen information which the TSP filter means which outputs changed TS, and the

above-mentioned graphics screen information creating means generate, While inserting in the TSP position canceled in TS changed from the above-mentioned TSP filter means, The TSP inserting means which corrects the above-mentioned number information to the number value of inserted TSP, and outputs it as changed TS, Input changed TS which the above-mentioned TSP filter means or the above-mentioned TSP inserting means generates, and only the number generates invalid TSP filled up with stuffing bytes from the number information of the changed TS, and these invalid TSP is transposed to the field to which number information is recorded, TSP in which graphics screen information was stored is taken out from changed TS which was generated by TS reproduction means which carries out regeneration of TS, and the above-mentioned TSP inserting means, While changed TS in which the minimum data that contains graphics screen information by having had a TSP extraction means to reproduce graphic information was stored is generable, By reproducing graphics screen information from this changed TS, a graphics screen is generable.

Brief Description of the Drawings

Drawing 1The lineblock diagram of the image compositing device by the embodiment of the invention 1

Drawing 2The figure which illustrates the graphics screen for analog broadcasting images in the above-mentioned Embodiment 1 which the graphics operation part 1 generates

Drawing 3The figure showing the relation between the graphics screen of drawing 2 in the above-mentioned Embodiment 1, and a switch signal when the specimen of the one line is carried out

Drawing 4The figure which illustrates the image with which the graphics screen was compounded by the analog broadcasting received image in the above-mentioned Embodiment 1

Drawing 5The lineblock diagram of the image compositing device by the embodiment of the invention 2

Drawing 6The figure which illustrates the graphics screen for analog broadcasting images in the above-mentioned Embodiment 1 which the graphics operation part 1 generates

Drawing 7The figure showing the relation between the graphics screen of drawing 6 in the above-mentioned Embodiment 2, and a switch signal when the specimen of the one line is carried out

Drawing 8The figure which illustrates the screen in the above-mentioned Embodiment 2 processed by the scaling part 210

Drawing 9The figure which illustrates the image with which the graphics screen was compounded by the analog broadcasting received image in the above-mentioned Embodiment 2

Drawing 10The lineblock diagram of the image compositing device by the embodiment of the invention 3

Drawing 11The waveform which shows the synchronized signal of an analog video signal in the above-mentioned Embodiment 3

Drawing 12The figure which illustrates the graphics screen for analog broadcasting images in the above-mentioned Embodiment 3 which the graphics operation part 1 generates

Drawing 13The figure showing the relation between the graphics screen of drawing 12 in the above-mentioned Embodiment 3, and a switch signal when the specimen of the one line is carried out

Drawing 14The figure which illustrates the example of an image in the above-mentioned Embodiment 3 in which the graphics screen was compounded by analog video

Drawing 15The lineblock diagram of the image compositing device by the embodiment of the invention 4

Drawing 16The figure which illustrates the graphics screen of the HDTV screen size in the above-mentioned Embodiment 4

Drawing 17The figure which specified the portion thinned out in the graphics screen of the HDTV screen size in the above-mentioned Embodiment 4

Drawing 18The figure which illustrates the graphics screen of the NTSC screen size which the memory data processing part 3 thins out and outputs with reference to the information of the scaling information Records Department in the above-mentioned Embodiment 4

Drawing 19The figure which illustrates the image with which the graphics screen was compounded by the analog broadcasting received image in the above-mentioned Embodiment 4

Drawing 20The lineblock diagram of the image compositing device by the embodiment of the invention 5

Drawing 21The figure which illustrates the graphics screen in the above-mentioned Embodiment 5

Drawing 22The figure which illustrates the information on the graphics screen of drawing 20 recorded on a non-usual picture area field in the above-mentioned Embodiment 5, and a waveform

Drawing 23The figure which illustrates the image before the graphics screen in the above-mentioned Embodiment 5 is compounded, and the compounded image

Drawing 24Some lineblock diagrams of the image compositing device by the embodiment of the invention 6

Drawing 25The figure which illustrates processing by the TSP filter part 610 in the above-mentioned Embodiment 6

Drawing 26The figure which illustrates processing of the TSP insert portion 611 in the above-mentioned Embodiment 6

Drawing 27The figure which illustrates processing of the TSP regenerating section 612 in the above-mentioned Embodiment 6

Drawing 28The figure which is used in explanation of the above-mentioned Embodiment 6 and which illustrates invalid TSP constituted according to the system parts of an MPEG 2 standard

Drawing 29The figure which illustrates the processing of TSP extract section 613 in the above-mentioned Embodiment 6

Drawing 30The lineblock diagram of the video graphics device for televisions shown in the conventional example

Drawing 31The lineblock diagram of the device which combined the conventional device

Description of Notations

- 1 Graphics operation part
- 2 Memory
- 3 Memory data processing part
- 4 Synchronous controlling part
- 5 Synchronizing detection part
- 6 NTSC decoder
- 7 Multiplexer
- 8 TV encoder
- 9 Display
- 210 Scaling part
- 310 Memory data processing part
- 311 Buffering part
- 410 Memory data processing part
- 411 Scaling information Records Department
- 412 Up converter
- 413 Down converter
- 414 Multiplexer
- 510 VTR
- 511 Graphics screen information generation part
- 512 Graphics screen regenerating section
- 513 Change machine
- 514 Change machine
- 610 TSP filter part
- 611 TSP insert portion
- 612 TSP regenerating section
- 613 TSP extract section

Drawing 1

For drawings please refer to the original document.

Drawing 2

For drawings please refer to the original document.

Drawing 3

For drawings please refer to the original document.

Drawing 4

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Drawing 5

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Drawing 6

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Drawing 7

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Drawing 12

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Drawing 8

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Drawing 9

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Drawing 10

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Drawing 11

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Drawing 13

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Drawing 14

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Drawing 16

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Drawing 17

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Drawing 28

For drawings please refer to the original document.

Drawing 15

For drawings please refer to the original document.

Drawing 18

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Drawing 19

For drawings please refer to the original document.

Drawing 20

For drawings please refer to the original document.

Drawing 21

For drawings please refer to the original document.

Drawing 23

For drawings please refer to the original document.

Drawing 27

For drawings please refer to the original document.

Drawing 29

For drawings please refer to the original document.

Drawing 22

For drawings please refer to the original document.

Drawing 24

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Drawing 25

For drawings please refer to the original document.

Drawing 26

For drawings please refer to the original document.

Drawing 30

For drawings please refer to the original document.

Drawing 31

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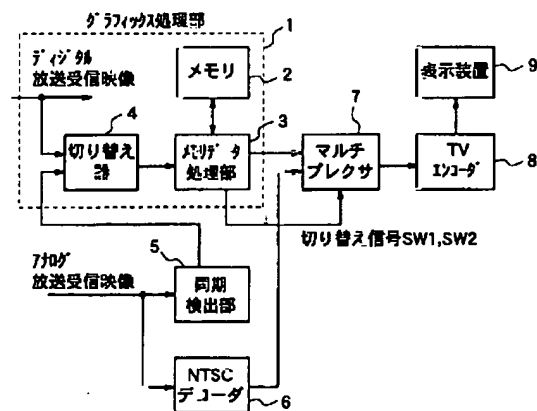
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(54)【発明の名称】 映像合成装置

(57) 【要約】

【課題】 1つのグラフィックス処理部が、複数の映像信号から選択された1つの映像信号のグラフィックス画面を生成することを目的とする。

【解決手段】 デジタル放送受信映像を入力としてグラフィックス画面を合成するグラフィックス処理部1が、アナログ放送受信映像のグラフィック画面を生成すると共に、グラフィックス画面合成用の切り替え信号を生成し、その切り替え信号を用いてマルチプレクサ7により合成することにより、アナログ放送受信映像にグラフィックス画面が合成された映像信号を得る。また、グラフィックス画面情報を映像信号の非有効表示期間に重畳することにより、グラフィックス画面の合成の選択が行えるようにする。



【特許請求の範囲】

【請求項1】 第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成するとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、該第2の映像信号から同期信号を検出する同期検出手段と、

第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号とを入力して、1つの同期信号を出力する同期信号切り替え手段と、上記グラフィックス処理手段からの、グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記グラフィックス処理手段からのグラフィックス切り替え信号と、上記第2の映像信号とを入力して、上記グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記第2の映像信号とを、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段と、を備えたことを特徴とする映像合成装置。

【請求項2】 第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成するとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、該第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号とを入力して、1つの同期信号を出力する同期信号切り替え手段と、上記グラフィックス処理手段からの、グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記グラフィックス処理手段からのグラフィックス切り替え信号と、上記第2の映像信号とを入力して、上記グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記第2の映像信号とを、上記グラフィックス切り替え信号を用いたマルチプレクスによりデジタル信号で合成するマルチプレクス手段と、を備えたことを特徴とする映像合成装置。

【請求項3】 第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成するとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、1つの同期信号を出力する同期信号切り替え手段と、第2の映像信号と、上記同期検出手段が出力する検出同

期信号とを入力して、映像の拡大処理、あるいは縮小処理を行うスケーリング手段と、

上記グラフィックス処理手段からの、グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記スケーリング手段からのスケーリングされた第2の映像信号とを入力して、上記グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記スケーリングされた第2の映像信号とを、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段と、を備えたことを特徴とする映像合成装置。

【請求項4】 第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成するとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、

第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、1つの同期信号を出力する同期信号切り替え手段と、第2の映像信号と、上記同期検出手段が出力する検出同期信号とを入力して、映像の拡大処理、あるいは縮小処理を行うスケーリング手段と、

上記グラフィックス処理手段からの、グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記スケーリング手段からのスケーリングされた第2の映像信号とを入力して、上記グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記スケーリングされた第2の映像信号とを、上記グラフィックス切り替え信号を用いたマルチプレクスによりデジタル信号で合成するマルチプレクス手段と、を備えたことを特徴とする映像合成装置。

【請求項5】 第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成する場合には、上記第2の映像信号がグラフィックス画面の合成可能な信号であるかどうかを示す状態信号によって、上記状態信号が合成可能であることを示していれば、第2の映像のグラフィックス画面信号を生成し、上記状態信号が合成不可能であることを示していれば、第2の映像のグラフィックス画面信号を生成しない、ものであるとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、該第2の映像信号から同期信号を検出する同期検出手段と、

第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、1つの同期信号を出力する同期信号切り替え手段と、

上記グラフィックス処理手段からの、グラフィックス画

面情報が重畳された信号またはグラフィックス画面信号と、上記第2の映像信号とを入力して、上記グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記第2の映像信号とを、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段と、を備えたことを特徴とする映像合成装置。

【請求項6】 第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成する場合には、上記第2の映像信号がグラフィックス画面の合成可能な信号であるかどうかを示す状態信号によって、上記状態信号が合成可能であることを示していれば、第2の映像のグラフィックス画面信号を生成し、上記状態信号が合成不可であることを示していれば、第2の映像のグラフィックス画面信号を生成しない、ものであるとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、該第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、1つの同期信号を出力する同期信号切り替え手段と、上記グラフィックス処理手段からの、グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記第2の映像信号とを入力して、上記グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記第2の映像信号とを、上記グラフィックス切り替え信号を用いたマルチプレクスによりデジタル信号で合成するマルチプレクス手段と、を備えたことを特徴とする映像合成装置。

【請求項7】 請求項1ないし請求項6のいずれかに記載の映像合成装置において、上記グラフィックス処理手段は、グラフィックス画面内の文字、記号等の有意図形に関して、有意図形部以外の画像の拡大あるいは縮小を行うためのスケーリング情報記録手段と、上記スケーリング情報記録手段のスケーリング情報を用いて上記グラフィックス画面の拡大あるいは縮小を行うグラフィックススケーリング手段と、を有することを特徴とする映像合成装置。

【請求項8】 映像信号の非有効画面領域に重畳するグラフィックス画面情報を生成するグラフィックス画面情報生成手段と、上記映像信号の非有効画面領域に上記グラフィックス画面情報が存在する場合、その一部に記された時刻と、表示装置もしくはVTRが有する時刻との差が一定値以内であれば、グラフィックス画面情報に基づくグラフィックス画面信号を、有効画面領域内に重畳するグラフィックス画面再生手段と、

を備えたことを特徴とする映像合成装置。

【請求項9】 請求項8に記載の映像合成装置において、デジタル放送のトランスポート・ストリーム（以下TSPと記す）から、視聴または記録する、番組、及び番組情報が記録されたトランスポート・ストリーム・パケット（以下TSPと記す）を取り出すとともに、その取り出すTSPに、破棄するTSPの個数、あるいは破棄しないTSPの個数を示す、固定長または可変長の個数情報を付加して、改変されたTSPを出力するTSPフィルタ手段と、

上記グラフィックス画面情報生成手段が生成するグラフィックス画面情報を、上記TSPフィルタ手段からの改変されたTSPにおいて破棄されたTSP位置に挿入するとともに、上記個数情報を、上記グラフィックス画面情報を挿入したTSPの個数値に修正して、改変されたTSPとして出力するTSP挿入手段と、上記TSPフィルタ手段またはTSP挿入手段が生成する改変されたTSPを入力して、その改変されたTSPの個数情報から、スタッフィングバイトで埋められた無効TSPをその個数だけ生成して、それら無効TSPを個数情報が記録されている領域に置き替えて、TSPを再生成するTSP再生手段と、上記TSP挿入手段により生成された、改変されたTSPから、グラフィックス画面情報が格納されたTSPを取り出して、グラフィック情報を再生するTSP抽出手段と、を備えたことを特徴とする映像合成装置。

【請求項10】 請求項1記載の映像合成装置において、上記マルチプレクス手段は、アナログ輝度信号Y、アナログ色差信号R-Y、及び、アナログ色差信号B-Yにより、または、アナログR信号、アナログG信号、及び、アナログB信号により、行われる、ことを特徴とする映像合成装置。

【請求項11】 請求項1ないし請求項7のいずれかに記載の映像合成装置において、上記グラフィックス処理手段は、第2の映像のグラフィックス画面の有効領域であるかどうかを示すイネーブル信号を出力する、ことを特徴とする映像合成装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、映像合成装置に関し、特に、グラフィックス画面信号を生成し、映像信号と合成する映像合成装置に関する。

【0002】

【従来の技術】映像信号とグラフィックス信号を混合処理して、テレビジョン受像機上に表示する従来の映像合成装置の構成図を、図30に示す。図30は、特開平9

-163259号の“テレビ用のビデオ・グラフィックス装置”に記載されている、会話型ビデオ処理が行われる加入者の構内にある加入者ケーブル・ボックス装置のブロック図である。

【0003】加入者ケーブル・ボックス装置にある、RFベースバンド・コンバータ920は、RFテレビジョン・チャンネル信号を受信し、このRFテレビジョン・チャンネル信号を、その多重化チャンネル周波数からベースバンド周波数に変換して、変換して得られたベースバンド合成ビデオ出力信号924を出力する。

【0004】コンバータ制御システム922は、遠隔のケーブル会社の中央局へ向け、またはこの中央局からケーブル927を通して、許可およびアクセス制御信号を受信および/または送信し、ベースバンド・ビデオ・スクランプリングまたはデスクランプリングを作動させ、スクリーンディスプレイ上(OSD)メッセージを作り出す。また、コンバータ制御システム922は、必要なチャンネル・プログラミングを選択するために、バス929を通して、RFベースバンド・コンバータ920に制御信号を出力し、シリアル・インタフェイス・プロセッサ930に、リード線931および933を通して、種々の制御信号および解読データ信号を出力する。

【0005】ROM934は、CPU936に対してプログラミングを行うことができる、例えばEPROMである。RAM935は、CPU936用のスクラッチ・パッド・メモリとして使用する。グラフィックス・メモリ938は、グラフィックスおよびビデオ映像に関するスプライト・データを記憶するメモリである。

【0006】YUV回路への復号装置944は、バス924から、ベースバンド合成映像ビデオ信号を受信し、結果として得られたYUVビデオ信号を、バス943上のメモリ制御装置およびスプライト状態マシン942に出力する。

【0007】メモリ制御装置およびスプライト状態マシン942は、データ・バス939を通して、グラフィックス・メモリ938に接続し、データ・バス945によって、ビデオ処理回路946に接続している。メモリ制御装置およびスプライト状態マシン942は、テレビジョン受像機の画面上の水平走査線内の予め定めた位置に、一つまたはそれ以上の各グラフィックスを組み立て、表示するために、予め定めた順序でグラフィックス・メモリ938のテーブルにアクセスする。

【0008】ビデオ処理回路946は、データバス945を通して、メモリ制御装置およびスプライト状態マシン942からのビデオ信号を受信し、遠隔のテレビジョン受像機(図示せず)にNTSCまたはPAL標準ビデオ信号を出力する。

【0009】

【発明が解決しようとする課題】しかしながら、上記従来例に示したテレビ用のビデオ・グラフィックス装置で

ある映像合成装置は、一種類の映像信号に対してのみグラフィックス画面が合成される構成を有するものであり、このような装置は、以下の課題点を有する。

1) 複数の映像信号から一つの映像信号を選択し、その選択された映像信号に対してグラフィックス画面を合成するような構成を有していない。

2) 特に、上記複数の映像信号の種類が異なる場合、例えば、1つがデジタル放送受信による映像信号であり、もう一つがアナログVTRにより再生されたアナログ映像信号であるような場合、図31のように従来の装置を組み合わせた装置999では、例えば、デジタル放送受信映像用のグラフィックス画面はデジタル合成されるが、アナログ映像信号は、VTR部が従来有していたグラフィックス処理部で合成されることになる。これは装置全体としてはグラフィックス処理部が2つ存在していることになり、コストアップの要因となってしまふ。また、2つのグラフィックス画面のイメージが異なり、視聴者に違和感を与えてしまうことにもなる。

【0010】従って、このような場合の映像合成装置においては、複数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみで、グラフィックス画面信号、またはグラフィックス画面情報が重畳された信号を生成し、映像信号と合成することが要求されている。

【0011】そこで、この発明は、複数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかに関係なく、1つのグラフィックス処理部のみで、グラフィックス画面信号、またはグラフィックス画面情報が重畳された信号を生成し、これを映像信号と合成することのできる画像合成装置を提供することを目的としている。

【0012】

【課題を解決するための手段】この課題を解決するために、本発明の請求項1にかかる発明は、第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成するとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記グラフィックス処理手段からのグラフィックス切り替え信号と、上記第2の映像信号を入力して、上記グラフィックス画面信号と上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段とを

有する映像合成装置としたものである。

【0013】本発明の請求項2にかかる発明は、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成することが可能なグラフィックス処理手段と、第2の映像信号を入力して、第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記グラフィックス処理手段からのグラフィックス切り替え信号と、上記第2の映像信号とを入力して、上記グラフィックス画面信号と上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。

【0014】本発明の請求項3にかかる発明は、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成することが可能なグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、第2の映像信号と、上記同期検出手段が出力する検出同期信号を入力して、映像の拡大処理や縮小処理を行うスケーリング手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記スケーリング手段からのスケーリングされた第2の映像信号を入力して、上記グラフィックス信号と上記スケーリングされた第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。

【0015】本発明の請求項4にかかる発明は、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成することが可能なグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、第2の映像信号と、上記同期検出手段が出力する検出同期信号を入力して、映像の拡大処理や縮小処理を行うスケーリング手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記スケーリング手段からのスケーリングされた第2の映像信号を入力して、上記グラフィックス信号と上記スケーリングされた第2の映像信号を、上記グラフィックス

切り替え信号を用いたマルチプレクスによりデジタル信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。

【0016】本発明の請求項5にかかる発明は、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成する場合には上記第2の映像信号がグラフィックス画面の合成可能な信号であるかどうかを示す状態信号によって、上記状態信号が合成可能であることを示していれば、第2の映像のグラフィックス画面信号を生成し、上記状態信号が合成不可であることを示していれば、第2の映像のグラフィックス画面信号を生成しない、ことを可能にするグラフィックス処理手段と、第2の映像信号を入力して、第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。

【0017】本発明の請求項6にかかる発明は、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成する場合には上記第2の映像信号がグラフィックス画面の合成可能な信号であるかどうかを示す状態信号によって、上記状態信号が合成可能であることを示していれば、第2の映像のグラフィックス画面信号を生成し、上記状態信号が合成不可であることを示していれば、第2の映像のグラフィックス画面信号を生成しない、ことを可能にするグラフィックス処理手段と、第2の映像信号を入力して、第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりデジタル信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。

【0018】本発明の請求項7にかかる発明は、請求項1ないし請求項6のいずれかに記載の映像合成装置において、上記グラフィックス処理手段は、グラフィックス画面内の文字、あるいは記号等の有意図形に関して、有意図形部以外の拡大、あるいは縮小を行うためのスケーリング情報記録手段と、上記スケーリング情報記録手段のスケーリング情報を用いてグラフィックス画面の拡大、あるいは縮小を行うグラフィックススケーリング手段とを有する映像合成装置としたものである。

【0019】本発明の請求項8にかかる発明は、映像信号の有効画面領域に重畳するグラフィックス画面情報を生成するグラフィックス画面情報生成手段と、上記映像信号の有効画面領域に上記グラフィックス画面情報が存在する場合、その一部に記された時刻と、表示装置もしくはVTRが有する時刻との差が一定値以内であれば、グラフィックス画面情報に基づくグラフィックス画面信号を、有効画面領域内に重畳するグラフィックス画面再生手段とを有する映像合成装置としたものである。

【0020】本発明の請求項9にかかる発明は、請求項8記載の映像合成装置において、デジタル放送のトランスポート・ストリーム（以下TSと記す）から、視聴または記録する、番組、及び番組情報が記録されたトランスポート・ストリーム・パケット（以下TSPと記す）を取り出すとともに、その取り出すTSPに、破棄するTSPの個数、あるいは破棄しないTSPの個数を示す、固定長または可変長の個数情報を付加することにより、改変されたTSを出力するTSPフィルタ手段と、上記グラフィックス画面情報生成手段が生成するグラフィックス画面情報を、上記TSPフィルタ手段からの改変されたTSにおいて破棄されたTSP位置に挿入するとともに、上記個数情報を、挿入したTSPの個数値に修正して、改変されたTSとして出力するTSP挿入手段と、上記TSPフィルタ手段または上記TSP挿入手段が生成する、改変されたTSを入力して、その改変されたTSの個数情報から、スタッフィングバイトで埋められた無効TSPをその個数だけ生成して、それら無効TSPを個数情報が記録されている領域に置き換えて、TSを再生成するTS再生手段と、上記TSP挿入手段により生成された、改変されたTSから、グラフィックス画面情報が格納されたTSPを取り出して、グラフィックス画面情報を再生するTSP抽出手段とを有する映像合成装置としたものである。

【0021】本発明の請求項10にかかる発明は、請求項1記載の映像合成装置において、上記マルチプレクス手段は、アナログ輝度信号Y、アナログ色差信号R-Y、及びアナログ色差信号B-Y、または、アナログR信号、アナログG信号、及びアナログB信号によって行われる映像合成装置としたものである。

【0022】本発明の請求項11にかかる発明は、請求項1ないし請求項7のいずれかに記載の映像合成装置において、上記グラフィックス処理手段は、第2の映像のグラフィックス画面の有効領域であるかどうかを示すイネーブル信号を出力するようにしたものである。

【0023】

【発明の実施の形態】（実施の形態1）以下に、本発明の請求項1及び請求項2に対応する、発明の実施の形態1について、図1から図4を用いて説明する。図1は、本実施の形態1による映像合成装置の構成図であり、その動作を解説する。図1において、1はグラフィックス

処理部、2はメモリ、3はメモリデータ処理部、4は切り替え器、5は同期検出部、6はNTSCデコーダ、7はマルチプレкса、8はTVエンコーダ、9は表示装置であり、以下に動作を説明する。

【0024】衛星放送等のデジタル放送受信映像を表示装置9に表示する場合において、デジタル放送映像にグラフィックス画面を合成する必要があるときには、グラフィックス処理部1がデジタル放送受信映像に、上記メモリ2から読み出したグラフィックス画面データを合成して、マルチプレкса7へ出力する。

【0025】このとき、メモリデータ処理部3は、マイコン等により切り替え制御される切り替え器4から入力されるデジタル放送受信映像の同期信号に同期して、上記メモリ2に存在するグラフィックス画面データを読み出し、これを、入力されるデジタル放送受信映像に合成して、マルチプレкса7に出力する。

【0026】メモリデータ処理部3は、マルチプレкса7が、該メモリデータ処理部3からのグラフィックス画面が合成されたデジタル映像信号を出力するように、切り替え信号SW1を出力する。マルチプレкса7は、切り替え信号SW1に従って切り替えて、グラフィックス画面が合成されたデジタル映像信号をTVエンコーダ8に出力する。TVエンコーダ8は、入力されるデジタル映像信号を、アナログ信号に変換して表示装置9に出力する。表示装置9は、入力される映像信号の映像を表示する。

【0027】一方、NTSCのようなアナログ放送受信映像を表示装置9に表示する場合において、アナログ放送受信映像にグラフィックス画面を合成する必要があるときには、デジタル放送受信映像用のグラフィックス画面を生成していたグラフィックス処理部1が、アナログ放送受信映像用のグラフィックス画面を、例えばデジタルビデオ信号の勧告であるITU-R601に準拠して生成し、マルチプレкса7へ出力する。図2に、グラフィックス処理部1が生成するアナログ放送受信映像用のグラフィックス画面の例を示す。

【0028】このとき、同期検出部5が、入力されるアナログ放送受信映像から同期信号を検出して、切り替え器4を経由してメモリデータ処理部3に出力する。メモリデータ処理部3は、入力されるアナログ放送受信映像の同期信号に同期して、メモリ2に存在するグラフィックス画面データを読み出してマルチプレкса7に出力すると共に、有効なグラフィックス画面データをマルチプレкса7へ出力しているかどうかを示す切り替え信号SW2をマルチプレкса7に出力する。この切り替え信号SW2は、グラフィックス画面のイネーブル信号であり、例えば、メモリ2に記録されているグラフィックス画面の画素データのうち、ある固有値が存在する画素は有効なグラフィックス画面の画素データではないことを示す信号である。図3に、図2のグラフィックス画面

と、該グラフィックス画面上で1ラインを標本したときの切り替え信号SW2との関係を示す。

【0029】また、NTSCデコーダ6は、アナログ放送受信映像をITUR601に準拠してデジタル化し、マルチプレクサ7へ出力する。マルチプレクサ7は、メモリデータ処理部3が生成する切り替え信号SW2に従って切り替えることにより、グラフィックス画面が合成されたデジタル映像信号を生成し、これをTVエンコーダ8に出力する。TVエンコーダ8は、入力されるデジタル映像信号を、アナログ信号に変換して、表示装置9に出力する。表示装置9は、入力される映像信号の映像を表示する。図4に、アナログ放送受信映像にグラフィックス画面が合成された映像の例を示す。

【0030】ところで、アナログ放送受信映像の同期信号に対する、グラフィックス処理部1の処理遅延量T1と、アナログ放送受信映像の同期信号に対する、NTSCデコーダ6のNTSCデコード処理の遅延量T2とが異なる場合において、 $T1 > T2$ の場合には、NTSCデコーダ6の処理過程で、 $(T1 - T2)$ だけの遅延調整を行えばよく、また、 $T1 < T2$ の場合には、グラフィックス処理部1の処理過程で、 $(T2 - T1)$ だけの遅延調整を行えばよく、これら遅延は一定であるため、例えば同期信号を遅延させること等により、容易に処理遅延差を補償できる。

【0031】また、本実施の形態1では、マルチプレクサ7によるグラフィックス画面の合成はデジタル信号に対して行われたが、アナログ信号をマルチプレクスすることにより合成を行ってもよい。この場合には、例えば、アナログ放送映像信号がコンポジットビデオ信号であれば、これをアナログ輝度信号Y、及びアナログ色差信号R-Y、アナログ色差信号B-Yにデコードした信号と、グラフィックス処理部1が生成するアナログ輝度信号Y、及びアナログ色差信号R-Y、アナログ色差信号B-Yのグラフィックス画面とを合成するようにする。このように、NTSCの映像信号のサブキャリア信号が存在しない状態でアナログ合成を行うことにより、合成する2つの信号のサブキャリアの周波数偏差や位相差の影響を受けずに合成を行なうことができ、コンポジットビデオ信号での合成に比べて、合成後の映像信号の色再現性が低下するのを抑えることができる。

【0032】このように、本実施の形態1による画像合成装置においては、第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成するとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、該第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号とを入力して、1つの同期信号を出力する

同期信号切り替え手段と、上記グラフィックス処理手段からの、グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記グラフィックス処理手段からのグラフィックス切り替え信号と、上記第2の映像信号とを入力して、上記グラフィックス画面情報が重畳された信号またはグラフィックス画面信号と、上記第2の映像信号とを、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号あるいはデジタル信号で合成するマルチプレクス手段とを備えたことにより、2つの映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみでグラフィックス画面を生成し、映像と該グラフィックス画面とを合成できる映像合成装置を得ることができる。

【0033】(実施の形態2)以下、本発明の請求項3及び請求項4に対応する、発明の実施の形態2について、図5から図9を用いて説明する。図5は、本実施の形態2による映像合成装置の構成図であり、その動作を説明する。図5において、1はグラフィックス処理部、2はメモリ、3はメモリデータ処理部、4は切り替え器、5は同期検出部、6はNTSCデコーダ、7はマルチプレクサ、8はTVエンコーダ、9は表示装置、210はスケーリング部であり、以下に、動作を説明する。

【0034】衛星放送等のデジタル放送受信映像を表示装置9に表示する場合において、デジタル放送受信映像にグラフィックス画面を合成する必要があるときについての動作は、上記実施の形態1の場合と同様であるので説明を省略する。

【0035】一方、NTSCのようなアナログ放送受信映像を表示装置9に表示する場合において、アナログ放送受信映像にグラフィックス画面を合成する必要があるときには、デジタル放送受信映像用のグラフィックス画面を生成していたグラフィックス処理部1が、アナログ放送受信映像用のグラフィックス画面を、例えばデジタルビデオ信号の勧告であるITUR601に準拠して生成し、マルチプレクサ7へ出力する。図6に、グラフィックス処理部1が生成するアナログ放送受信映像用のグラフィックス画面の例を示す。

【0036】このとき、同期検出部5が、入力されるアナログ放送受信映像から同期信号を検出して、切り替え器4を経由してメモリデータ処理部3に出力する。メモリデータ処理部3は、入力されるアナログ放送受信映像の同期信号に同期して、メモリ1に存在するグラフィックス画面データを読み出してマルチプレクサ7に出力するとともに、有効なグラフィックス画面データをマルチプレクサ7へ出力しているかどうかを示す切り替え信号SW2をマルチプレクサ7に出力する。この切り替え信号SW2は、グラフィックス画面のイネーブル信号であり、例えば、メモリ2に記録されているグラフィックス

画面の画素データのうち、ある固有値が存在する画素は有効なグラフィックスの画素データではないことを示す信号である。図7に、図6のグラフィックス画面と、該グラフィックス画面上で1ラインを標本したときの切り替え信号SW2との関係を示す。

【0037】また、NTSCデコーダ6は、アナログ放送受信映像をITUR601フォーマットに準拠してデジタル化し、スケーリング部210へ出力する。スケーリング部210は、デジタル化されたアナログ放送受信映像の画面サイズをスケーリング処理により変えて、上記同期検出部5から入力される検出同期信号に同期してマルチプレクサ7に出力する。

【0038】スケーリング部210では、一般的に知られている処理が行われる。例えば、デジタル映像のバッファリングのために、2ポートを有するビデオメモリが用いられ、1つのポートがデジタル映像データの書き込み用、もう1つのポートが読み出し用となる。映像の画面サイズを変更する場合、画面縮小時には、ビデオメモリへ書き込む直前に書き込み領域の切り取りや、画素やラインの間引きが行われ、画面拡大時には、ビデオメモリから読み出された後に画素補間やライン補間が行われる。図8に、スケーリング部210で行われる映像の画面と、縮小スケーリングされた後の映像の画面の例を示す。

【0039】マルチプレクサ7は、メモリデータ処理部3が生成する切り替え信号SW2に従って切り替えることにより、グラフィックス画面が合成されたデジタル映像信号を生成し、これをTVエンコーダ8に出力する。

【0040】TVエンコーダ8は、入力されるデジタル映像信号を、アナログ信号に変換して表示装置9に出力する。表示装置9は、入力される映像信号の映像を表示する。図9に、スケーリングされたアナログ放送受信映像に、グラフィックス画面が合成された映像の例を示す。

【0041】ところで、アナログ放送受信映像の同期信号に対する、グラフィックス処理部1の処理遅延量T201と、アナログ放送受信映像の同期信号に対する、NTSCデコーダ6のNTSCデコーダ処理と、スケーリング部210の処理の遅延量T202とが異なる場合において、 $T201 > T202$ の場合には、NTSCデコーダ6、またはスケーリング部210の処理過程で、 $(T201 - T202)$ だけの遅延調整を行えばよく、また、 $T201 < T202$ の場合には、グラフィックス処理部1の処理過程で、 $(T202 - T201)$ だけの遅延調整を行えばよく、これらの遅延は一定であるため、例えば、同期信号を遅延させること等により、容易に処理遅延差を補償することができる。

【0042】このように、本実施の形態2による画像合成装置においては、本発明の請求項3にかかる発明は、

第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成することが可能なグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、第2の映像信号と、上記同期検出手段が出力する検出同期信号を入力して、映像の拡大処理や縮小処理を行うスケーリング手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記スケーリング手段からのスケーリングされた第2の映像信号を入力して、上記グラフィックス信号と上記スケーリングされた第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号あるいはデジタル信号で合成するマルチプレクス手段とを備えたことにより、2つの映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるか、デジタルであるかという種類に関係なく、1つのグラフィックス処理部のみでグラフィックス画面を生成し、映像と該グラフィックス画面とを合成することができるとともに、映像と、グラフィックス画面内に示された文字とを、重ならないように並べて配置することができ、映像が文字の下に隠れて見えなくなってしまうということのない映像合成装置を得ることができる。

【0043】(実施の形態3) 以下に、本発明の請求項5及び請求項6に対応する、実施の形態3について、図10から図14を用いて説明する。図10は、本実施の形態3による映像合成装置の構成図であり、その動作を説明する。図10において、1はグラフィックス処理部、2はメモリ、4は切り替え器、305は同期検出部、6はNTSCデコーダ、7はマルチプレクサ、8はTVエンコーダ、9は表示装置、310はメモリデータ処理部、311はバッファリング部であり、以下に、動作を説明する。

【0044】衛星放送等のデジタル放送受信映像を表示装置9に表示する場合において、デジタル放送映像にグラフィックス画面を合成する必要があるときについての動作は、上記実施の形態1の場合と同様であるので説明を省略する。ここで、本実施の形態3によるメモリデータ処理部310は、上記実施の形態1によるメモリデータ処理部3と同様の動作をする。

【0045】一方、NTSCのようなアナログ映像を表示装置8に表示する場合において、アナログ映像にグラフィックス画面を合成する必要があるときには、デジタル放送受信映像用のグラフィックス画面を生成していたグラフィックス処理部1が、アナログ映像用のグラフィックス画面を、例えばデジタルビデオ信号の勧告であるITUR601に準拠して生成し、マルチプレクサ

7へ出力する。

【0046】ただし、このアナログ映像用のグラフィックス画面の生成は、図10に示される状態信号STに依存してこれを行なうものとする。この状態信号STとは、アナログ映像の信号状態を示すものであり、アナログ映像が放送受信映像のような標準信号の場合（例えば状態信号の電位レベルがハイレベルとする）には、アナログ映像用のグラフィックス画面の生成を行い、VTRの特殊再生映像のような非標準信号の場合（例えば状態信号の電位レベルがロウレベルとする）には、図11(a)に示されるように、同期信号が非標準的信号となるため、アナログ映像用のグラフィックス画面の生成を行わない、ようにするためのものである。即ち、この状態信号STは、例えば、本実施の形態3による映像合成装置が組み込まれる、VTR等の機器が有する、アナログ映像の状態を示す信号である。

【0047】当然のことながら、上記アナログ映像信号が非標準信号であっても、同期検出部5による同期信号の検出時に、PLLを用いることによって、欠落した同期パルス部が補正された同期信号（図11(b)に示す）が生成され、これによりグラフィックス画面の合成が常に正常に行われるならば、上記状態信号STは、標準信号と同じ状態をとることになる。

【0048】図12に、グラフィックス処理部1により、アナログ映像用のグラフィックス画面の生成が行われる場合のグラフィックス画面の例を示す。グラフィックス処理部1により、アナログ映像用のグラフィックス画面の生成が行われる場合、同期検出部305が、入力されるアナログ映像から同期信号を検出して、これを、切り替え器4を経由してメモリデータ処理部310に出力する。

【0049】メモリデータ処理部310は、入力されるアナログ映像の同期信号に同期して、メモリ2に存在するグラフィックス画面データを読み出して、マルチプレクサ7に出力するとともに、有効なグラフィックス画面データをマルチプレクサ7へ出力しているかどうかを示す切り替え信号SW2を、マルチプレクサ7に出力する。この切り替え信号SW2は、グラフィックス画面のイネーブル信号であり、例えば、メモリ2に記録されているグラフィックス画面の画素データのうち、ある固有値が存在する画素は、有効なグラフィックスの画素データではないことを示す信号である。図13に、図12のグラフィックス画面と、該グラフィックス画面上で1ラインを標本したときの切り替え信号SW2との関係を示す。

【0050】また、NTSCデコーダ6は、アナログ映像信号を、ITUR601に準拠してデジタル化し、バッファリング部311へ出力する。バッファリング部311は、デジタル化されたアナログ映像を一時バッファリングし、これを、グラフィックス処理部1へ入力

される同期検出部305からの検出同期信号に同期して、または、グラフィックス処理部1が生成した同期信号に同期して、マルチプレクサ7に出力する。

【0051】このバッファリング部311では、一般的に知られている処理が行われる。例えば、デジタル映像のバッファリングのために、2ポートを有するビデオメモリが用いられ、1つのポートがデジタル映像データの書き込み用、もう1つのポートが読み出し用となり、入力される同期信号に従って、メモリへの読み書きが行われる。

【0052】また、マルチプレクサ7は、メモリデータ処理部3が生成する切り替え信号SW1に従って切り替えることにより、グラフィックス画面が合成されたデジタル映像を生成し、これをTVエンコーダ8に出力する。TVエンコーダ8は、入力されるデジタル映像信号を、アナログ信号に変換して表示装置9に出力する。表示装置9は、入力される映像信号の映像を表示する。図14に、アナログ映像にグラフィックス画面が合成された映像の例を示す。

【0053】ところで、アナログ放送受信映像の同期信号に対する、グラフィックス処理部1の処理遅延量T301と、アナログ映像信号の同期信号に対する、NTSCデコーダ6のNTSCデコーダ処理とバッファリング部311の処理の遅延量T302とが異なる場合において、T301>T302の場合には、NTSCデコーダ6またはバッファリング部311の処理過程で、(T301-T302)だけの遅延調整を行えばよく、また、T301<T302の場合には、グラフィックス処理部1の処理過程で、(T302-T301)だけの遅延調整を行えばよく、これらの遅延は一定であるため、例えば、同期信号を遅延させること等により、容易に処理遅延差を補償することができる。

【0054】このように、本実施の形態3による画像合成装置においては、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成する場合には上記第2の映像信号がグラフィックス画面の合成可能な信号であるかどうかを示す状態信号によって、上記状態信号が合成可能であることを示していれば、第2の映像のグラフィックス画面信号を生成し、上記状態信号が合成不可能であることを示していれば、第2の映像のグラフィックス画面信号を生成しない、ことを可能にするグラフィックス処理手段と、第2の映像信号を入力して、第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号あるいはデジタル信

号で合成するマルチプレクス手段とを備えたことにより、2つの映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみで、状態信号に基づいて、グラフィックス画面を生成し、映像と該グラフィックス画面とを合成できる映像合成装置を得ることができる。

【0055】(実施の形態4)以下に、本発明の請求項7に対応する、実施の形態4について、図15から図19を用いて説明する。図15は、本実施の形態4による映像合成装置の構成図であり、その動作を説明する。図15において、1はグラフィックス処理部、2はメモリ、4は切り替え器、5は同期検出部、6はNTSCデコード、7はマルチプレкса、8はTVエンコード、9は表示装置、410はメモリデータ処理部、411はスケール情報記録部、412はアップコンバータ、413はダウンコンバータ、414はマルチプレкса、415はTVエンコード、416はNTSC用表示装置であり、以下に、動作を説明する。

【0056】衛星放送等のデジタル放送受信映像を表示装置9に表示する場合において、デジタル放送受信映像にグラフィックス画面を合成する必要があるときについての動作は、上記実施の形態1の場合と同様であるので説明を省略する。ここで、本実施の形態3によるメモリデータ処理部410の動作は、上記実施の形態1によるメモリデータ処理部3と同様の動作をする。

【0057】また、デジタルHDTV等のデジタル放送受信映像をNTSC用の表示装置416に表示する場合において、デジタル放送受信映像にグラフィックス画面を合成する必要があるときには、グラフィックス処理部1がデジタル放送受信映像にグラフィックス画面を合成して、ダウンコンバータ413へ出力する。このとき、メモリデータ処理部410は、マイコン等により切り替え制御される切り替え器4から入力されるデジタル放送受信映像の同期信号に同期して、メモリ2に存在するグラフィックス画面データを読み出し、これを入力されるデジタル放送受信映像に合成して、ダウンコンバータ413に出力する。

【0058】ダウンコンバータ413は、入力されるデジタルHDTV映像をNTSC映像にダウンコンバートしてマルチプレкса414へ出力する。グラフィックス処理部1は、マルチプレкса414に、ダウンコンバータ413からの信号を出力するように、切り替え信号SW1を出力する。マルチプレкса414は、グラフィックス処理部1が生成する切り替え信号SW1に従って、ダウンコンバータ413からの信号、即ち、NTSCの映像にダウンコンバートされたデジタル放送受信映像を、NTSCエンコード415に出力する。NTSCエンコード415は、入力されるデジタル映像信号を、アナログ信号に変換して、表示装置416に出力す

る。表示装置416は、入力される映像信号の映像を表示する。

【0059】さらに、NTSCのようなアナログ放送受信映像をHDTV用の表示装置9に表示する場合において、アナログ放送受信映像にグラフィックス画面を合成する場合には、デジタル放送受信映像用のグラフィックス画面を生成していたグラフィックス処理部1が、アナログ放送受信映像用のグラフィックス画面をHDTVと同じ画面フォーマットで生成して、マルチプレкса7へ出力するとともに、HDTVの同期信号をアップコンバータ412に出力する。このとき、メモリデータ処理部410は、入力されるアナログ放送受信映像の同期信号に同期して、メモリ2に存在するグラフィックス画面データを読み出してマルチプレкса7に出力するとともに、有効なグラフィックス画面データをマルチプレкса7へ出力しているかどうかを示す切り替え信号SW2をマルチプレкса7に出力する。

【0060】また、NTSCデコード6は、アナログ放送受信映像をITUR601フォーマットに準拠してデジタル化し、アップコンバータ412へ出力する。アップコンバータ412は、デジタル化されたアナログ放送受信映像をHDTVの画面サイズに変換し、グラフィックス処理部1からの上記HDTVの同期信号に同期して、NTSCをアップコンバートした映像をマルチプレкса7に出力する。

【0061】マルチプレкса7は、メモリデータ処理部410が生成する切り替え信号に従って切り替えることにより、グラフィックス画面が合成されたデジタル放送受信映像を生成し、これをTVエンコード8に出力する。TVエンコード8は、入力されるデジタル映像信号を、アナログ信号に変換して、表示装置9に出力する。表示装置9は、入力される映像信号の映像を表示する。

【0062】ところで、アナログ放送受信映像の同期信号に対する、NTSCデコード6およびアップコンバータ411の処理の遅延量T401と、アナログ放送受信映像の同期信号に対する、グラフィックス処理部401の処理の遅延量T402とが異なる場合において、 $T401 > T402$ の場合には、NTSCデコード6またはアップコンバータ412の処理過程で、 $(T401 - T402)$ だけの遅延調整を行えばよく、また、 $T401 < T402$ の場合には、グラフィックス処理部1の処理過程で、 $(T402 - T401)$ だけの遅延調整を行えばよく、これら遅延は一定であるため、例えば同期信号を遅延させること等により、容易に処理遅延差を補償することができる。

【0063】さらに、NTSCのようなアナログ放送受信映像をNTSC用の表示装置416に表示する場合において、アナログ放送映像にグラフィックス画面を合成する必要があるときには、デジタル放送受信映像用の

グラフィックス画面を生成していたグラフィックス処理部1が、アナログ放送映像用のグラフィックス画面を生成する。図16に、HDTV画面サイズのグラフィックス画面の例を示す。

【0064】このとき、メモリデータ処理部410は、スケーリング情報記録部411の情報をもとに、HDTVサイズのグラフィックス画面からNTSCサイズのグラフィックス画面へダウンコンバートすることにより、アナログ放送映像用のグラフィックス画面を生成する。例えば、HDTVサイズの有効画面領域が1フレーム当たり、横1920画素、縦1080ラインであり、これを、NTSCサイズの有効画面領域が1フレーム当たり、横720画素、縦480ラインの画面サイズにダウンコンバートする場合には、HDTVサイズの有効画面領域から、縦方向に1200ライン、横方向に600ラインを、例えば破棄する必要があるが、どの縦方向ラインと、横方向ラインとを破棄するかは、スケーリング情報記録部411に記録されている。このスケーリング情報記録部411に記録されている情報は、1080ビット+1920ビットの合計3000ビットのバイナリ情報であって、前半の1080ビットは、横方向ラインを破棄するべきかどうかを有効画面上端のラインから順次示し、後半の1920ビットは、縦方向ラインを破棄するべきかどうかを有効画面左端から順次示すものであり、1が破棄することを意味し、ゼロが破棄しないことを意味する。例えば、スケーリング情報記録部411の最初の値が1であれば、HDTVサイズの有効画面領域の上端横1ラインを破棄することを意味する。また、例えば、スケーリング情報記録部411の1081番目の値がゼロであれば、HDTVサイズの有効画面領域の左端縦1ラインを破棄しないことを意味する。

【0065】メモリデータ処理部410は、この合計3000ビットの各値を参照しながら、メモリ2のHDTVサイズの画面データからダウンコンバートに必要な画素を取得する。このとき、メモリデータ処理部410が生成するグラフィックス画面は、メモリ2の中の少なくとも有意図形を構成する領域の画素が破棄されずに、全て取得されて生成されるものであり、そのように生成されるべき情報がスケーリング情報記録部411に記録されていて、スケーリングを行うときに用いられることが、本実施の形態4の特徴である。図17に、HDTV画面サイズのグラフィックス画面において間引く部分を明示した図を示す。図18に、スケーリング情報記録部の情報を参照してメモリデータ処理部3が間引いて出力するNTSC画面サイズのグラフィックス画面の例を示す。

【0066】また、このときメモリデータ処理部410は、同期検出部5がアナログ放送受信映像から検出して切り替え器4を経由して出力する同期信号に同期して、メモリ2からグラフィックス画面データを読み出してダ

ウンコンバータ413に出力することになるが、横方向ラインの取得については、1ラインの非有効画面領域の期間に、破棄ラインの計数と、次の取得ラインが存在するメモリ内の位置算出、とが行われる。破棄する横方向ラインが連続している場合には、その破棄ラインの計数時間は、破棄ライン数に比例して増大するが、1ラインの非有効画面領域の期間にその計数が終了するようなビット値が、スケーリング情報記録部411に記録されている。例えば、非有効画面領域の1ラインの期間が、10000nsecであり、スケーリング情報記録部411からのビット情報連続読み出しによる連続破棄ラインの1計数が、50nsec、メモリ2から読み出す取得ラインを設定する時間が、100nsecであれば、186ライン(10000nsec-100nsec=9900nsec、9900nsec÷50nsec=198ライン)まで、連続ライン破棄の設定を行なうことができる。つまり、スケーリング情報記録部411に、ゼロが198個までは連続して存在してよいことを意味するが、実際は198ラインも連続して破棄することはなく、従ってメモリからの連続読み出し処理は円滑に行われる。

【0067】こうして、読み出された1ライン内の全画素中から、さらにグラフィックス画面を生成する画素を取得する必要があるが、これについては、例えば、NTSCの1ラインあたりの画素数分(例えば、858画素分あれば十分である)のFIFOメモリを利用して、スケーリング情報記録部411の先頭からのビット情報を順次読み出して値を調べることににより、上記FIFOに入力するかどうかを判別し、値が1の場合は入力するが、値がゼロの場合は入力しないように制御し、さらに、上記検出同期信号の次パルスで順次、同様に読み出し始めるとともに、次ラインの取得画素を同様に入力するという、一連の動作を繰り返すことによって、NTSC画面サイズのグラフィックス画面を生成することができる。このようにして、メモリデータ処理部410は、メモリ2から取得したグラフィックス画面データをマルチプレクサ414に出力するとともに、さらに有効なグラフィックス画面データをマルチプレクサ414へ出力しているかどうかを示す切り替え信号SW1、SW2を、マルチプレクサ414に出力する。

【0068】以上のようにして、メモリデータ処理部3は、入力されるアナログ放送受信映像の同期信号に同期して、メモリ2に存在するグラフィックス画面データをスケーリング情報記録部411の情報をもとにダウンコンバートして、ダウンコンバータ413に出力する。ダウンコンバータ413は、既にNTSCの画面サイズに変換されて入力されるグラフィックス画面を、そのままマルチプレクサ414に出力する。

【0069】また、NTSCデコーダ6は、アナログ放送受信映像を、ITUR601に準拠してデジタル化

し、マルチプレクサ414へ出力する。マルチプレクサ414は、メモリデータ処理部410が生成する上記切り替え信号SW1、SW2に従って切り替えて、グラフィックス画面が合成されたデジタル映像信号をNTSCエンコーダ415に出力する。このときメモリデータ処理部410が生成する切り替え信号SW1、SW2は、デジタル化されたアナログ放送受信映像に、グラフィックス画面が合成されるような信号である。

【0070】従って、マルチプレクス414の出力は、アナログ放送受信映像にグラフィックス画面が合成されたデジタル信号となる。NTSCエンコーダ415は、入力されるデジタル映像信号を、アナログ信号に変換してNTSC用表示装置416に出力する。NTSC用表示装置416は、入力される映像信号の映像を表示する。図19に、アナログ放送受信映像にグラフィックス画面が合成された映像の例を示す。

【0071】ところで、アナログ放送受信映像の同期信号に対する、グラフィックス処理部1とダウンコンバータ413の処理遅延量T403と、アナログ放送受信映像の同期信号に対する、NTSCデコーダ6のNTSCデコーダ処理の処理の遅延量T404とが異なる場合において、 $T403 > T404$ の場合には、NTSCデコーダ6の処理過程で、 $(T403 - T404)$ だけの遅延調整を行えばよく、また、 $T403 < T404$ の場合には、グラフィックス処理部1とダウンコンバータ413の処理過程で、 $(T404 - T403)$ だけの遅延調整を行えばよく、これらの遅延は一定であるため、例えば同期信号を遅延させること等により、容易に処理遅延差を補償することができる。

【0072】このように、本実施の形態4による画像合成装置においては、上記実施の形態1ないし3による画像合成装置において、グラフィックス処理手段は、グラフィックス画面内の文字、あるいは記号等の有意図形に関して、有意図形部以外の拡大、あるいは縮小を行うためのスケーリング情報記録手段と、上記スケーリング情報記録手段のスケーリング情報を用いてグラフィックス画面の拡大、あるいは縮小を行うグラフィックススケーリング手段とを備えたことにより、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成する場合には上記第2の映像信号がグラフィックス画面の合成可能な信号であるかどうかを示す状態信号によって、上記状態信号が合成可能であることを示していれば、第2の映像のグラフィックス画面信号を生成し、上記状態信号が合成不可であることを示していれば、第2の映像のグラフィックス画面信号を生成しない、ことを可能にするグラフィックス処理手段と、第2の映像信号を入力して、第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択さ

れる1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号あるいはデジタル信号で合成するマルチプレクス手段とを備えたことにより、2つの映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみで、グラフィックス画面を生成し、映像と、該グラフィックス画面とを合成できる映像合成装置を得ることができる。

【0073】(実施の形態5)以下に、本発明の請求項8に対応する、実施の形態5について、図20から図23を用いて説明する。図20は、本実施の形態5による映像合成装置の構成図である。図20において、1はグラフィックス処理部、2はメモリ、3はメモリデータ処理部、4は切り替え器、5は同期検出部、6はNTSCデコーダ、7はマルチプレクサ、8はTVエンコーダ、9は表示装置、510はVTR、511はグラフィックス画面情報生成部、512はグラフィックス画面再生部、513は切り替え器、514は切り替え器であり、以下に動作を説明する。

【0074】衛星放送等のデジタル放送受信映像を表示装置9に表示する場合において、デジタル放送受信映像にグラフィックス画面を合成する必要があるときには、グラフィックス処理部1がデジタル放送受信映像にグラフィックス画面を合成して、マルチプレクサ7へ出力する。

【0075】このとき、メモリデータ処理部3は、マイコン等により切り替え制御される切り替え器4から入力されるデジタル放送受信映像の同期信号に同期して、メモリ2に存在するグラフィックス画面データを読み出して、入力されるデジタル放送受信映像に合成して、グラフィックス画面情報生成部511に出力する。

【0076】グラフィックス画面情報生成部511は切り替え器513へ、グラフィックス画面情報生成部511の信号を出力するように切り替え信号SW3を切り替え器513に送り、メモリデータ処理部3は、マルチプレクサ7へ、切り替え器513からの信号を出力するように切り替え信号SW4を出力する。

【0077】切り替え器513およびマルチプレクサ7は、それぞれ、切り替え信号SW3、SW4に従って切り替えることにより、グラフィックス画面が合成されたデジタル放送受信映像がTVエンコーダ8に出力される。TVエンコーダ8は、入力されるデジタル映像信号を、アナログ信号に変換して表示装置9に出力する。表示装置9は、入力される映像信号の映像を表示する。

【0078】ところで、NTSCのようなアナログ放送受信映像をVTR510に録画する場合において、アナログ放送映像にグラフィックス画面を合成する必要があ

るときに、上記の処理によりデジタル放送受信映像用のグラフィックス画面を生成していたグラフィックス処理部1が生成するアナログ放送映像用のグラフィックス画面が合成されたアナログ映像を録画してしまうと、合成されたグラフィックス画面までも録画されてしまう。

【0079】そこで、アナログ映像を録画する場合には、グラフィックス画面情報生成部511が、グラフィックス画面情報を生成して、切り替え器513を介しマルチプレクサ7に出力するとともに、同期検出部からの検出同期信号に同期して、該グラフィックス画面情報を非有効画面領域に重畳するための切り替え信号SW5を、マルチプレクサ7に出力する。

【0080】グラフィックス画面情報生成部511が生成するグラフィックス画面情報は、例えば、グラフィックス画面を構成するキャラクタコード群と、それらキャラクタコードの表示位置、表示色、背景色、生成時刻である。NTSC映像の場合、非有効画面領域に重畳する情報量としては、例えば、クローズドキャプション情報重畳用のラインや、複製可否情報を含むCGMS-A情報重畳用のラインを除く、1フレームあたり40ライン、1ラインあたり64ビットが、このグラフィックス画面情報として重畳される。この場合、1フレームあたり、40ライン×64ビット=2560ビット=320バイトの情報量であり、グラフィックス画面に文字が表示されるような場合においては、時刻情報や色情報、属性情報として、例えば200バイトを占有しても、残り120バイトを文字情報に割り当てることが可能となり、これは1フレームあたりの文字情報量としては十分な値である。図21に、グラフィックス画面例と、非有効画面領域に記録される情報を例示する。図21におけるグラフィックス画面は、1998年7月10日13時5分に生成されたことを示しており、文字列“ABC”、および文字列“DEF”が、図中の属性を有して表示されている、としている。

【0081】また、図22に、非有効画面領域に記録される、図21のグラフィックス画面の情報と波形の例を示す。図22では、わかりやすくするために、1ライン当たり8ビット重畳する場合について示している。図22のビット列“1111010000001001”において、先頭の8ビット“11110100”は、“T”を示し、後半の8ビット“00001001”は、“9”を示す。上記では、非有効画面領域に重畳するグラフィックス情報は、文字情報として説明したが、記号や図形等の任意の情報でもよい。

【0082】また、アナログ放送受信映像は、NTSCデコーダ6によってデジタル化され、切り替え器514を介して、マルチプレクサ7に出力する。マルチプレクサ7は、グラフィックス画面情報生成部511が生成する切り替え信号SW6に従って切り替えて、グラフィックス画面が合成されたデジタル映像をTVエンコー

ダ8に出力する。このとき、グラフィックス画面情報生成部511が生成する切り替え信号SW6は、デジタル化されたアナログ放送映像の特定の非有効画面領域に、グラフィックス画面情報が重畳されるような信号である。従って、マルチプレクサ7の出力は、アナログ放送受信映像にグラフィックス画面情報が重畳されたデジタル信号となる。

【0083】TVエンコーダ8は、入力されるデジタル映像信号を、アナログ信号に変換してVTR510に出力する。VTR510は、入力される映像信号を録画する。

【0084】さらに、上記のようにして録画された、グラフィックス画面情報付きアナログ映像信号が再生される場合には、グラフィックス画面再生部512が、非有効画面領域のグラフィックス画面情報を取得して、該グラフィックス画面情報からグラフィックス画面を再生して、切り替え器514により、マルチプレクサして生成する。この再生は、例えば、映像信号の水平同期信号から、グラフィックス画面情報を取り出すためのクロックを、同期信号パルスにロックするPLLにより生成して、これを用いてサンプリングすることにより、ビット情報が得られ、さらにグラフィックス画面情報が得られることになる。また、グラフィックス画面は、このグラフィックス画面情報からグラフィックス画面のビットマップを、グラフィックス画面再生部512内のビデオメモリに展開して、同期信号にしたがって、メモリからグラフィックス画面データを読み出すことにより、得ることができる。このメモリとしては、グラフィックス画面再生部512内部に有するメモリの他に、メモリ2が共用で用いられてもよい。そして、このグラフィックス画面を映像信号の同期信号に同期して合成すれば、グラフィックス画面が合成された映像が得られる。

【0085】このとき、グラフィックス画面再生部512は、その再生画面信号を映像信号に重畳するための切り替え信号SW6を、切り替え器514に出力する。この切り替え信号SW6は、グラフィックス画面のイネーブル信号であり、例えば、グラフィックス画面の画素データのうち、ある固有値が存在する画素は、有効なグラフィックスの画素データではないことを示す信号である。

【0086】切り替え器514は、グラフィックス画面情報生成部511が生成する切り替え信号SW6に従って切り替えて、グラフィックス画面が合成されたデジタル映像をマルチプレクサ7に出力し、マルチプレクサ7は、グラフィックス画面が合成されたデジタル映像を、そのままTVエンコーダ8に出力する。TVエンコーダ8は、入力されるデジタル映像信号を、アナログ信号に変換して、表示装置9に出力する。表示装置9は、入力される映像信号の映像を表示する。

【0087】図23に、グラフィックス画面が合成され

る前の映像と、合成された映像を例示する。ところで、上記のグラフィックス画面再生部512、および切り替え器514によるグラフィックス画面の生成と合成は、表示装置9内部にも持たせてもよく、この場合、現在の時刻と、非有効画面領域内に記録された時刻との差が一定値未満（例えば1秒未満）であれば、グラフィックス画面を表示するべきであると判断してグラフィックス画面の再生および合成を行い、非有効画面領域内に記録された時刻との差が一定値以上（例えば1秒以上）であれば、既にVTRに録画されたテープからの再生等であって、グラフィックス画面を直ちに表示する必要はないと判断して、グラフィックス画面の再生、および合成を行わないようにすれば、表示のためのグラフィックス画面が合成された映像と、録画のためのグラフィックス画面が合成されていない映像、の2つを生成する必要はなく、グラフィックス画面情報が非有効画面領域に重畳された1つの映像信号を生成するのみで、これを、表示および録画の両者に利用できるようになる。また、さらに視聴者がグラフィック画面の表示を選択できるようにすることによって、視聴者の意思に応じて、グラフィックス画面が合成された映像と、合成されていない映像とを選んで表示して、視聴できるようにもなる。

【0088】また、上記グラフィックス情報は、デジタル放送受信映像に対応するものとして、上記と同様の方法で、デジタル放送受信映像信号の非有効画面領域に重畳されてもよい。

【0089】当然のことながら、本実施の形態5において、VTRに記録しない場合、例えば、NTSCのようなアナログ放送受信映像を表示装置9に表示する場合において、アナログ放送受信映像にグラフィックス画面を合成する必要があるときには、上記実施の形態1で行ったように、デジタル放送受信映像用のグラフィックス画面を生成していたグラフィックス処理部1が、アナログ放送受信映像用のグラフィックス画面を、例えばデジタルビデオ信号の勧告であるITUR601に準拠して生成して、マルチプレクサ7により、デジタル化されたアナログ放送受信映像と合成するようにしてもよい。

【0090】このように、本実施の形態5による画像合成装置においては、映像信号の非有効画面領域に重畳するグラフィックス画面情報を生成するグラフィックス画面情報生成手段と、上記映像信号の非有効画面領域に上記グラフィックス画面情報が存在する場合、その一部に記された時刻と、表示装置もしくはVTRが有する時刻との差が一定値以内であれば、グラフィックス画面情報に基づくグラフィックス画面信号を、有効画面領域内に重畳するグラフィックス画面再生手段とを備えたことにより、2つの数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグ

ラフィックス処理部のみで、グラフィックス画面およびグラフィックス画面情報を生成することができる。また、グラフィックス画面が合成された映像信号を表示装置で表示しながらVTRに録画する場合であっても、表示のためのグラフィックス画面が合成された映像と、録画のためのグラフィックス画面が合成されていない映像、との2つを生成する必要はなく、表示および録画の両者に利用可能な、グラフィックス画面情報が非有効画面領域に重畳された映像を生成することのできる映像合成装置を提供することができる。

【0091】また、上記実施の形態1ないし5においては、2つの映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみで、グラフィックス画面と映像信号を合成することができる映像合成装置を提供することができる。当然のことながら、上記選択されるべき映像信号は、3つ以上の映像信号であってもよい。

【0092】（実施の形態6）本発明の実施の形態8による映像合成装置は、上記実施の形態5の映像合成装置に、図24に示される部分が追加されるものである。図24において、610はTSPフィルタ部、611はTSP挿入部、612はTSP再生部、613はTSP抽出部であり、以下に、動作を説明する。

【0093】TSPフィルタ部610は、図25に示されるように、デジタル放送のトランスポート・ストリーム（これはMPEG2規格システムパート、ITU-T Rec H. 222.0 | ISO/IEC 13818-1で策定されている。以下TSと記す。）から、視聴または記録する、番組及び番組情報が記録されたトランスポート・ストリーム・パケット（以下TSPと記す）を取り出すとともに、その取り出すTSPに、破棄するTSPの個数や、破棄しないTSPの個数を示す、固定長または可変長の個数情報を付加することにより、改変されたTSを出力する。

【0094】TSP挿入部611は、図26に示されるように、上記実施の形態5における、グラフィックス画面情報生成手段511が生成するグラフィックス画面情報を、MPEG2規格に従って、例えば1つのプライベートデータとしてシンタックスに準じて定義し、これを上記TSPフィルタ手段からの改変されたTSにおいて破棄されたTSP位置に挿入して、改変されたTSとして出力する。このとき、上記個数情報を、挿入したTSPの個数値により修正することも行う。また、グラフィックス画面情報が格納されたTSPの挿入に当たって、PIDやテーブルID等のTSP内のデータを識別するための値は、既に規定されて割り振られている値以外の値を使用する。また、上記実施の形態5においては、グラフィックス画面情報は320バイトとしており、これを格納するにはTSPが最低2つ必要となる。一般的に

は、グラフィックス画面情報量を格納できるだけの個数のTSPを生成してTSに挿入する。当然のことながら、このTSPの挿入位置は、取り扱いの対象としているTSの先頭や最後部であってもよい。

【0095】TS再生部612は、図27に示されるように、上記TSPフィルタ手段610、または上記TSP挿入手段611が生成する、改変されたTSを入力して、その改変されたTSの個数情報から、スタッフィングバイトで埋められた無効TSPをその個数だけ生成して、それら無効TSPを、個数情報が記録されている領域に置き替えることにより、TSを再生成する。

【0096】図28に、MPEG2規格のシステムパートに従って構成された無効TSPの例を示す。図28では、188バイトで構成される1TSPにおいて、先頭4バイトの後ろに、184バイトとしたアダプテーションフィールドが続いていて、そのアダプテーションフィールド内の後ろ182バイトに、スタッフィングバイトが挿入されて、無効TSPが構成されている。TSP抽出部613は、図29に示されるように、上記TSP挿入手段611により生成された改変されたTSから、グラフィックス画面情報が格納されたTSPを取り出して、グラフィック情報を再生する。

【0097】本実施の形態6による映像合成装置においては、TSから記録に必要なTSPだけを効率よく取り出すことにより、記録領域を無駄にすることなく、記録を行なうことができるとともに、それをTSP再生部612により再生する場合にも、破棄したTSPの個数がわかっているために、PCRと呼ばれるTSP内の時間情報を有効に使用できるTSを再生することができ、このため、例えば、TSデコードとよばれるTSPを処理する装置に、この再生されたTSを入力することによっても、正常に処理を行なうことができる。

【0098】さらに、グラフィックス画面情報が格納されたTSPをTSに挿入して記録メディアに記録できるようになり、この記録されたTSを再生してグラフィックス画面を合成することができる。当然のことながら、グラフィックス画面情報が格納されたTSPは、独立した1つ以上のTSとして生成してもよい。また、グラフィックス画面情報は、デジタル放送受信映像に限定されるものではなく、アナログ放送受信映像用のグラフィックス画面情報であってもよい。

【0099】また、上記において、TSPフィルタ部610では不要なTSPを破棄して個数情報を付加し、TSP挿入部611ではTSPを挿入する、ものとして説明したが、TSPを破棄せずに1つのTSをそのまま記録するような場合におけるグラフィックス画面情報の取り扱いについては、グラフィックス画面情報が格納された別の1TSとして生成すればよい。

【0100】このように、本実施の形態6による画像合成装置においては、上記実施の形態5による画像合成装

置において、デジタル放送のトランスポート・ストリーム（以下TSと記す）から、視聴または記録する、番組、及び番組情報が記録されたトランスポート・ストリーム・パケット（以下TSPと記す）を取り出すとともに、その取り出すTSPに、破棄するTSPの個数、あるいは破棄しないTSPの個数を示す、固定長または可変長の個数情報を付加することにより、改変されたTSを出力するTSPフィルタ手段と、上記グラフィックス画面情報生成手段が生成するグラフィックス画面情報を、上記TSPフィルタ手段からの改変されたTSにおいて破棄されたTSP位置に挿入するとともに、上記個数情報を、挿入したTSPの個数値に修正して、改変されたTSとして出力するTSP挿入手段と、上記TSPフィルタ手段または上記TSP挿入手段が生成する、改変されたTSを入力して、その改変されたTSの個数情報から、スタッフィングバイトで埋められた無効TSPをその個数だけ生成して、それら無効TSPを個数情報が記録されている領域に置き換えて、TSを再生成するTS再生手段と、上記TSP挿入手段により生成された、改変されたTSから、グラフィックス画面情報が格納されたTSPを取り出して、グラフィック情報を再生するTSP抽出手段とを備えたことにより、グラフィックス画面情報を含む最小限のデータが格納された、改変されたTSを生成できるとともに、この改変されたTSからグラフィックス画面情報を再生することにより、グラフィックス画面を生成することができる。

【0101】

【発明の効果】以上のように、本発明の請求項1にかかる発明によれば、第1の映像信号を入力してこれにグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成するとともに、該グラフィックス画面信号の切り替えを指示するグラフィックス切り替え信号を出力するグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記グラフィックス処理手段からのグラフィックス切り替え信号と、上記第2の映像信号を入力して、上記グラフィックス画面信号と上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。これにより、第1の映像にグラフィックス画面を合成する上記グラフィックス処理手段は、上記切り替え手段を経由して入力される第2の映像信号の検出同期信号により、第2の映像信号に合成するグラフィックス画面信号を生成し、上記マルチプレクス手段は、第2の映像に合成するグラフィックス画面信号と第2の映

像をアナログ信号で合成することにより、複数の映像信号から選択された映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみでグラフィックス画面信号、またはグラフィックス画面情報が重畳された信号を生成し、映像信号と合成することができるために、装置のコストダウンがはかれるとともに、視聴者に、各映像信号に対して統一された、違和感のないイメージのグラフィックス画面を提供できる。

【0102】本発明の請求項2にかかる発明によれば、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成することが可能なグラフィックス処理手段と、第2の映像信号を入力して、第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記グラフィックス処理手段からのグラフィックス切り替え信号と、上記第2の映像信号とを入力して、上記グラフィックス画面信号と上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。これにより、第1の映像にグラフィックス画面信号を合成する上記グラフィックス処理手段は、上記切り替え手段を経由して入力される第2の映像信号の検出同期信号により、第2の映像信号に合成するグラフィックス画面信号を生成し、上記マルチプレクス手段は、第2の映像信号に合成するグラフィックス画面信号と第2の映像をデジタル信号で合成することにより、複数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみでグラフィックス画面を生成し、映像と該グラフィックス画面とを合成できる。

【0103】本発明の請求項3にかかる発明によれば、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成することが可能なグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、第2の映像信号と、上記同期検出手段が出力する検出同期信号を入力して、映像の拡大処理や縮小処理を行うスケーリング手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記スケーリング手段からのスケーリングされた第2の映像信号を入力して、上記グラフィックス信号と上記

スケーリングされた第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。これにより、第1の映像にグラフィックス画面信号を合成する上記グラフィックス処理手段は、上記切り替え手段を経由して入力される第2の映像信号の検出同期信号により、第2の映像信号に合成するグラフィックス画面信号を生成し、上記スケーリング手段は、第2の映像を拡大または縮小して出力し、上記マルチプレクス手段は、第2の映像信号に合成するグラフィックス画面信号とスケーリング後の第2の映像信号をアナログ信号で合成することにより、複数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるか、デジタルであるかという種類に関係なく、1つのグラフィックス処理部のみでグラフィックス画面を生成し、映像と該グラフィックス画面とを合成できるとともに、映像と、グラフィックス画面内に示された文字とを、重ならないように並べて配置することができ、映像が文字の下に隠れて見えなくなってしまうことを防止できる。

【0104】本発明の請求項4にかかる発明によれば、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成することが可能なグラフィックス処理手段と、第2の映像信号を入力して、その第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、第2の映像信号と、上記同期検出手段が出力する検出同期信号を入力して、映像の拡大処理や縮小処理を行うスケーリング手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記スケーリング手段からのスケーリングされた第2の映像信号を入力して、上記グラフィックス信号と上記スケーリングされた第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりデジタル信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。これにより、第1の映像にグラフィックス画面信号を合成する上記グラフィックス処理手段は、上記切り替え手段を経由して入力される第2の映像信号の検出同期信号により、第2の映像信号に合成するグラフィックス画面信号を生成し、上記スケーリング手段は、第2の映像を拡大または縮小して出力し、上記マルチプレクス手段は、第2の映像信号に合成するグラフィックス画面信号とスケーリング後の第2の映像信号をデジタル信号で合成することにより、複数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるか、デジタルであるかという種類に関係なく、1つのグラフィックス処理部のみでグラフィックス画面を生成し、映像と該

ラフィックス画面とを合成することができるとともに、映像と、グラフィックス画面内に示された文字とを、重ならないように並べて配置することができ、映像が文字の下に隠れて見えなくなってしまうことを防止できる。

【0105】本発明の請求項5にかかる発明は、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成する場合には上記第2の映像信号がグラフィックス画面の合成可能な信号であるかどうかを示す状態信号によって、上記状態信号が合成可能であることを示していれば、第2の映像のグラフィックス画面信号を生成し、上記状態信号が合成不可であることを示していれば、第2の映像のグラフィックス画面信号を生成しない、ことを可能にするグラフィックス処理手段と、第2の映像信号を入力して、第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりアナログ信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。これにより、第2の映像のグラフィックス画面信号を生成する場合には、第2の映像信号がチューナの放送受信等による標準信号のようにグラフィックス画面の合成が可能な映像信号であるか、またはVTRによるアナログテープの特殊再生信号であって同期パルスが補正されない非標準信号のようにグラフィックス画面の合成が不可能な映像信号であるかという状態信号によって、上記状態信号が、グラフィックス画面の合成が可能であることを示しているときには、第2の映像のグラフィックス画面信号を生成して、上記マルチプレクス手段が、第2の映像信号に合成するグラフィックス画面信号と上記第2のアナログ映像信号を合成し、上記状態信号が、グラフィックス画面の合成が不可能であることを示しているときには、上記グラフィックス処理手段は第2の映像のグラフィックス画面信号を生成しないようにすることにより、複数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみで、状態信号に基づいて、グラフィックス画面を生成し、映像と該グラフィックス画面とを合成できる。

【0106】本発明の請求項6にかかる発明は、第1の映像信号を入力してグラフィックス画面信号を合成するか、または第2の映像のグラフィックス画面信号を生成する場合には上記第2の映像信号がグラフィックス画面の合成可能な信号であるかどうかを示す状態信号によって、上記状態信号が合成可能であることを示していれば、第2の映像のグラフィックス画面信号を生成し、上

記状態信号が合成不可であることを示していれば、第2の映像のグラフィックス画面信号を生成しないことを可能にするグラフィックス処理手段と、第2の映像信号を入力して、第2の映像信号から同期信号を検出する同期検出手段と、第1の映像信号の同期信号と、上記同期検出手段が検出する第2の映像信号の検出同期信号を入力して、選択される1つの同期信号を出力する切り替え手段と、上記グラフィックス処理手段からのグラフィックス画面信号と、上記第2の映像信号を、上記グラフィックス切り替え信号を用いたマルチプレクスによりデジタル信号で合成するマルチプレクス手段とを有する映像合成装置としたものである。これにより、第2の映像のグラフィックス画面信号を生成する場合には、第2の映像信号がチューナの放送受信等による標準信号のようにグラフィックス画面の合成が可能な映像信号であるか、またはVTRによるアナログテープの特殊再生信号であって同期パルスが補正されない非標準信号のようにグラフィックス画面の合成が不可能な映像信号であるかという状態信号によって、上記状態信号が、グラフィックス画面の合成が可能であることを示しているときには、第2の映像のグラフィックス画面信号を生成して、上記マルチプレクス手段が、第2の映像信号に合成するグラフィックス画面信号と上記第2のデジタル映像信号を合成し、上記状態信号が、グラフィックス画面の合成が不可能であることを示しているときには、上記グラフィックス処理手段は第2の映像のグラフィックス画面信号を生成しないことにより、複数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみで、状態信号に基づいて、グラフィックス画面を生成し、映像と該グラフィックス画面とを合成できる。

【0107】本発明の請求項7にかかる発明は、請求項1ないし請求項6のいずれかに記載の映像合成装置において、上記グラフィックス処理手段は、グラフィックス画面内の文字、あるいは記号等の有意図形に関して、有意図形部以外の拡大、あるいは縮小を行うためのスケーリング情報記録手段と、上記スケーリング情報記録手段のスケーリング情報を用いてグラフィックス画面の拡大、あるいは縮小を行うグラフィックススケーリング手段とを有する映像合成装置としたものである。これにより、上記グラフィックス処理手段内の上記グラフィックススケーリング手段は、グラフィックス画面の拡大や縮小を行う場合には、スケーリング情報記録手段の情報により、グラフィックス画面の有意図形が存在しない水平ラインや垂直画素列を拡大処理や縮小処理の対象とすることにより、複数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみで、グラフィックス画面を生

成し、映像と、該グラフィックス画面とを合成できる映像合成装置を得ることができる。

【0108】本発明の請求項8にかかる発明は、映像信号の有効画面領域に重畳するグラフィックス画面情報を生成するグラフィックス画面情報生成手段と、上記映像信号の有効画面領域に上記グラフィックス画面情報が存在する場合、その一部に記された時刻と、表示装置もしくはVTRが有する時刻との差が一定値以内であれば、グラフィックス画面情報に基づくグラフィックス画面信号を、有効画面領域内に重畳するグラフィックス画面再生手段とを有する映像合成装置としたものである。これにより、グラフィックス画面信号が合成された映像信号を表示装置で表示しながらVTRに録画する場合であっても、グラフィックス画面が合成された表示のための映像と、グラフィックス画面が合成されていない録画のための映像の2つを生成する必要なく、第1のグラフィックス画面情報が有効画面領域に重畳された1つの映像のみで、表示および録画に利用できることにより、複数の数の映像信号から選択された1つの映像信号に対して、その選択された映像信号がアナログであるかデジタルであるかという種類に関係なく、1つのグラフィックス処理部のみで、グラフィックス画面およびグラフィックス画面情報を生成することができる。また、グラフィックス画面が合成された映像信号を表示装置で表示しながらVTRに録画する場合であっても、表示のためのグラフィックス画面が合成された映像と、録画のためのグラフィックス画面が合成されていない映像、との2つを生成する必要はなく、表示および録画の両者に利用可能な、グラフィックス画面情報が有効画面領域に重畳された映像を生成することができる。

【0109】本発明の請求項9にかかる発明は、請求項8記載の映像合成装置において、デジタル放送のトランスポート・ストリーム（以下TSと記す）から、視聴または記録する、番組、及び番組情報が記録されたトランスポート・ストリーム・パケット（以下TSPと記す）を取り出すとともに、その取り出すTSPに、破棄するTSPの個数、あるいは破棄しないTSPの個数を示す、固定長または可変長の個数情報を付加することにより、改変されたTSを出力するTSPフィルタ手段と、上記グラフィックス画面情報生成手段が生成するグラフィックス画面情報を、上記TSPフィルタ手段からの改変されたTSにおいて破棄されたTSP位置に挿入するとともに、上記個数情報を、挿入したTSPの個数値に修正して、改変されたTSとして出力するTSP挿入手段と、上記TSPフィルタ手段または上記TSP挿入手段が生成する、改変されたTSを入力して、その改変されたTSの個数情報から、スタッフィングバイトで埋められた無効TSPをその個数だけ生成して、それら無効TSPを個数情報が記録されている領域に置き換えて、TSを再生するTS再生手段と、上記TSP挿入

手段により生成された、改変されたTSから、グラフィックス画面情報が格納されたTSPを取り出して、グラフィックス画面情報を再生するTSP抽出手段とを有する映像合成装置としたものである。これにより、グラフィックス画面情報を含む最小限のデータが格納された、改変されたTSを生成できるとともに、この改変されたTSからグラフィックス画面情報を再生して、グラフィックス画面を生成できることにより、グラフィックス画面情報を含む最小限のデータが格納された、改変されたTSを生成できるとともに、この改変されたTSからグラフィックス画面情報を再生することにより、グラフィックス画面を生成することができる。

【0110】本発明の請求項10にかかる発明は、請求項1記載の映像合成装置において、上記マルチプレクス手段は、アナログ輝度信号Y、アナログ色差信号R-Y、及びアナログ色差信号B-Y、または、アナログR信号、アナログG信号、及びアナログB信号によって行われる映像合成装置としたものである。これにより、上記マルチプレクス手段によるアナログ合成において、例えば、NTSCの映像信号のサブキャリア信号が存在しない状態でアナログ合成を行うことにより、合成する2つの信号のサブキャリアの周波数誤差や位相差の影響を受けずに合成することができることにより、NTSCの映像信号のサブキャリア信号が存在しない状態でアナログ合成を行うことにより、合成する2つの信号のサブキャリアの周波数誤差や位相差の影響を受けずに合成を行なうことができ、コンポジットビデオ信号での合成に比べて、合成後の映像信号の色再現性が低下するのを抑えることができる。

【0111】本発明の請求項11にかかる発明は、請求項1ないし請求項7のいずれかに記載の映像合成装置において、上記グラフィックス処理手段は、第2の映像のグラフィックス画面の有効領域であるかどうかを示すイネーブル信号を出力するようにしたものである。これにより、上記イネーブル信号を、グラフィックス画面信号と映像信号のマルチプレクスによる合成に用いることができる。

【図面の簡単な説明】

【図1】 本発明の実施の形態1による映像合成装置の構成図

【図2】 上記実施の形態1における、グラフィックス処理部1が生成するアナログ放送映像用のグラフィックス画面を例示する図

【図3】 上記実施の形態1における、図2のグラフィックス画面と、1ラインを標本したときの切り替え信号との関係を示す図

【図4】 上記実施の形態1における、アナログ放送受信映像にグラフィックス画面が合成された映像を例示する図

【図5】 本発明の実施の形態2による映像合成装置の

構成図

【図6】 上記実施の形態1における、グラフィックス処理部1が生成するアナログ放送映像用のグラフィックス画面を例示する図

【図7】 上記実施の形態2における、図6のグラフィックス画面と、1ラインを標本したときの切り替え信号との関係を示す図

【図8】 上記実施の形態2における、スケーリング部210で処理される画面を例示する図

【図9】 上記実施の形態2における、アナログ放送受信映像にグラフィックス画面が合成された映像を例示する図

【図10】 本発明の実施の形態3による映像合成装置の構成図

【図11】 上記実施の形態3における、アナログ映像信号の同期信号を示す波形

【図12】 上記実施の形態3における、グラフィックス処理部1が生成するアナログ放送映像用のグラフィックス画面を例示する図

【図13】 上記実施の形態3における、図12のグラフィックス画面と、1ラインを標本したときの切り替え信号との関係を示す図

【図14】 上記実施の形態3における、アナログ映像にグラフィックス画面が合成された映像例を例示する図

【図15】 本発明の実施の形態4による映像合成装置の構成図

【図16】 上記実施の形態4における、HDTV画面サイズのグラフィックス画面を例示する図

【図17】 上記実施の形態4における、HDTV画面サイズのグラフィックス画面において間引く部分を明示した図

【図18】 上記実施の形態4における、スケーリング情報記録部の情報を参照してメモリデータ処理部3が間引いて出力するNTSC画面サイズのグラフィックス画面を例示する図

【図19】 上記実施の形態4における、アナログ放送受信映像にグラフィックス画面が合成された映像を例示する図

【図20】 本発明の実施の形態5による映像合成装置の構成図

【図21】 上記実施の形態5における、グラフィックス画面を例示する図

【図22】 上記実施の形態5における、非有効画面領域に記録される、図20のグラフィックス画面の情報と波形を例示する図

【図23】 上記実施の形態5における、グラフィック

ス画面が合成される前の映像と合成された映像を例示する図

【図24】 本発明の実施の形態6による映像合成装置の一部の構成図

【図25】 上記実施の形態6における、TSPフィルタ部610での処理を例示する図

【図26】 上記実施の形態6における、TSP挿入部611の処理を例示する図

【図27】 上記実施の形態6における、TSP再生部612の処理を例示する図

【図28】 上記実施の形態6の説明において用いる、MPEG2規格のシステムパートに従って構成された無効TSPを例示する図

【図29】 上記実施の形態6における、TSP抽出部613の処理を例示する図

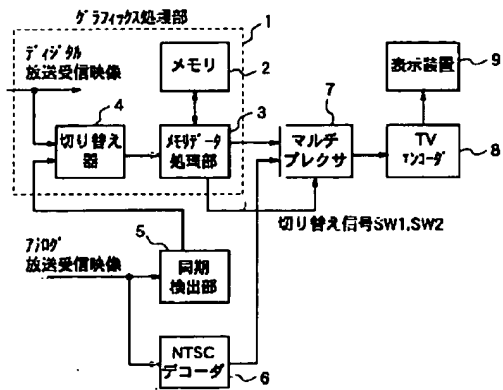
【図30】 従来例に示したテレビ用のビデオ・グラフィックス装置の構成図

【図31】 従来の装置を組み合わせた装置の構成図

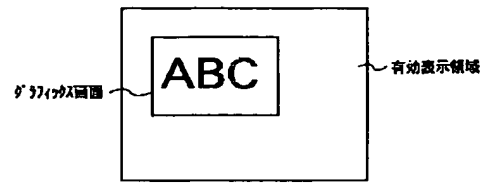
【符号の説明】

- 1 グラフィックス処理部
- 2 メモリ
- 3 メモリデータ処理部
- 4 同期制御部
- 5 同期検出部
- 6 NTSCデコーダ
- 7 マルチプレкса
- 8 TVエンコーダ
- 9 表示装置
- 210 スケーリング部
- 310 メモリデータ処理部
- 311 バッファリング部
- 410 メモリデータ処理部
- 411 スケーリング情報記録部
- 412 アップコンバータ
- 413 ダウンコンバータ
- 414 マルチプレкса
- 510 VTR
- 511 グラフィックス画面情報生成部
- 512 グラフィックス画面再生部
- 513 切り替え器
- 514 切り替え器
- 610 TSPフィルタ部
- 611 TSP挿入部
- 612 TSP再生部
- 613 TSP抽出部

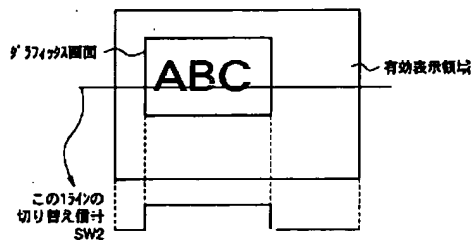
【図1】



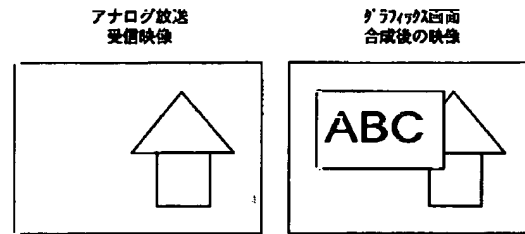
【図2】



【図3】

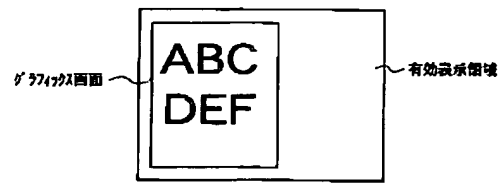
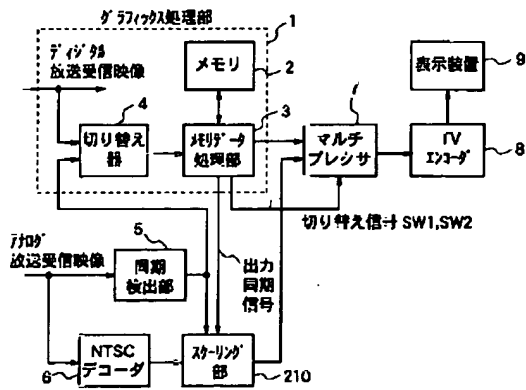


【図4】

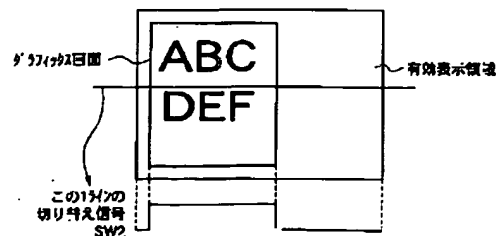


【図6】

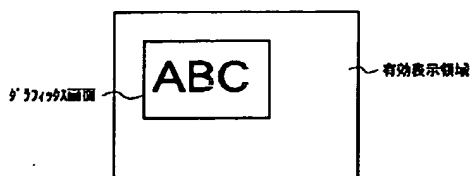
【図5】



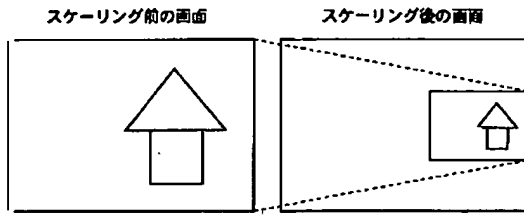
【図7】



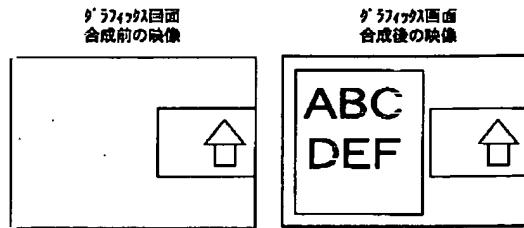
【図12】



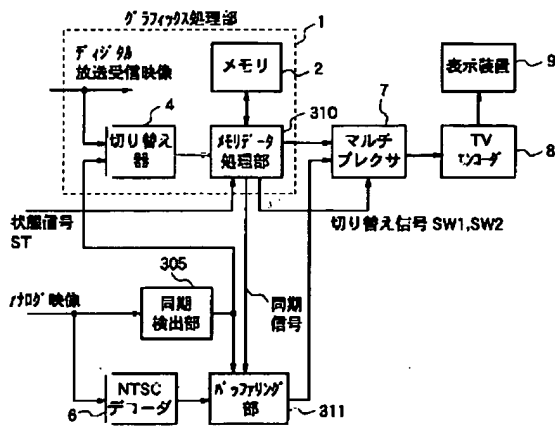
【図8】



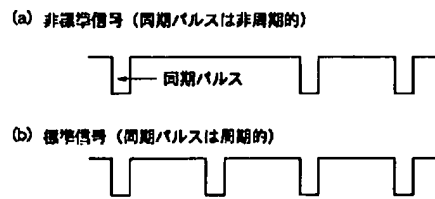
【図9】



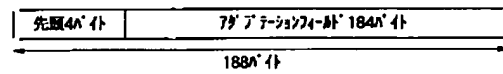
【図10】



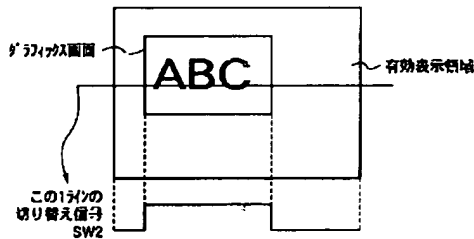
【図11】



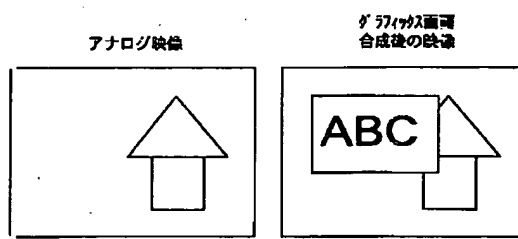
【図12】



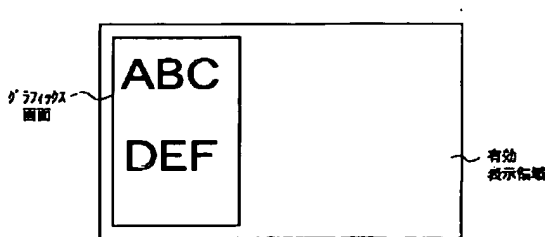
【図13】



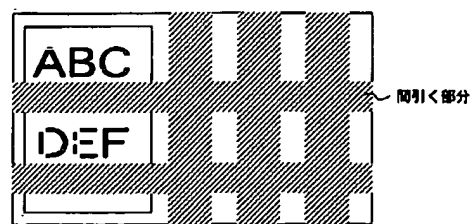
【図14】



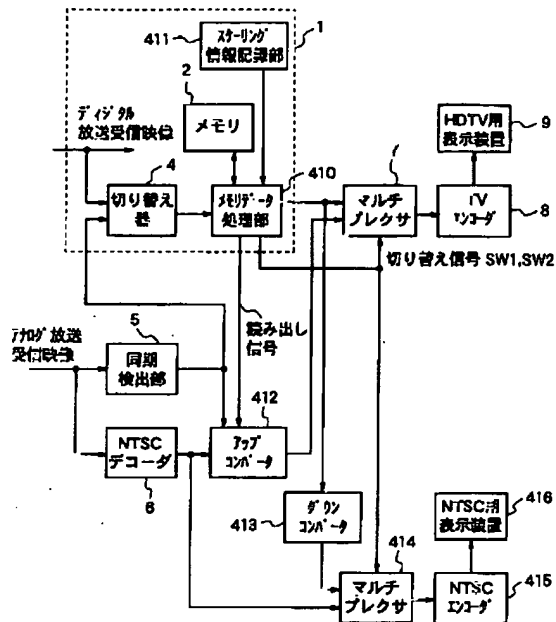
【図15】



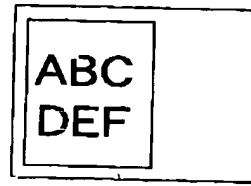
【図16】



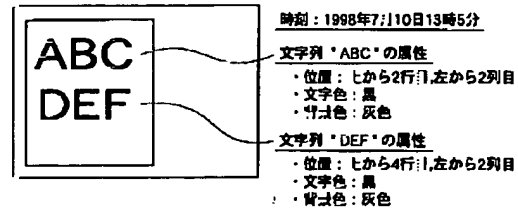
【図15】



【図18】

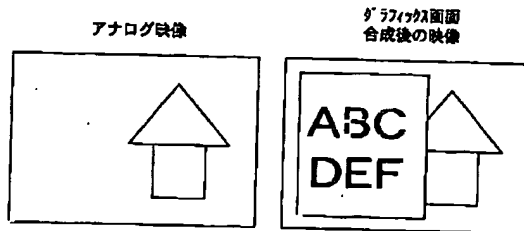


【図21】

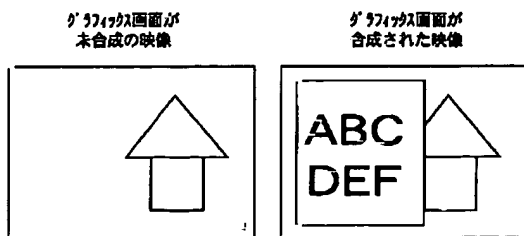


【図19】

【図20】



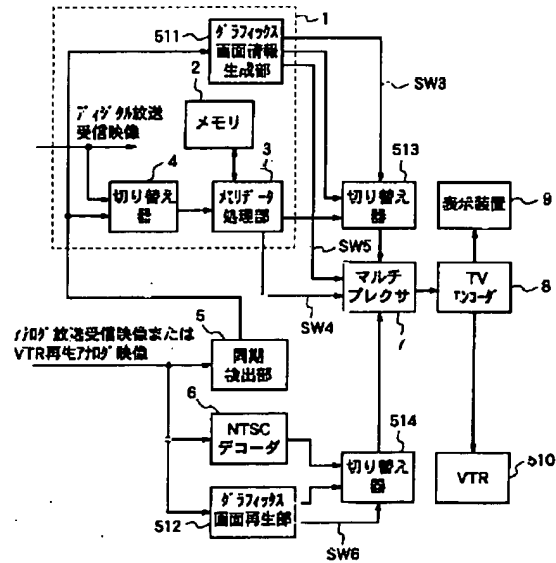
【図23】



【図29】

入力	4'nt1	21	Graphics TSP	1	4'nt1	20	4'nt1	1	PSI
----	-------	----	--------------	---	-------	----	-------	---	-----

出力:
図22の非有効画領域に記録される情報と同じグラフィックス画面情報



【図27】

入力	4'nt1	21	Graphics TSP	1	4'nt1	20	4'nt1	1	PSI
----	-------	----	--------------	---	-------	----	-------	---	-----

出力	4'nt1	無効TSP	無効TSP	4'nt1	4'nt1	PSI
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【図22】

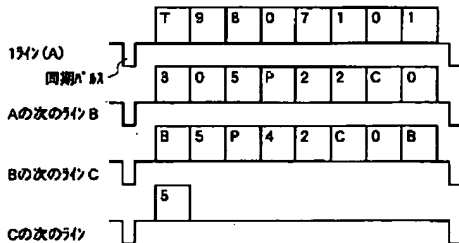
非有効画面領域に記録される情報例

情報	1	9	8	0	7	1	0	1	3	0	5	P	2
意味	時刻	年	年	月	月	日	日	時	時	分	分	位	行

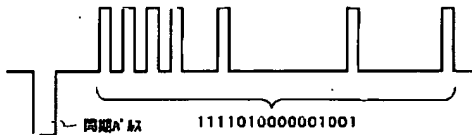
た下へ続く

情報	2	C	0	B	5	P	4	2	C	0	B	5
意味	画列	文字	色	背景	色	位置	行	列	文字	色	背景	色

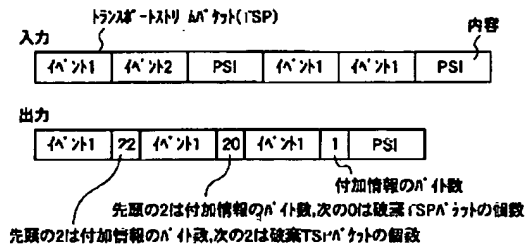
非有効画面領域に重畳される情報 (177/240当たり8ビット重畳時)



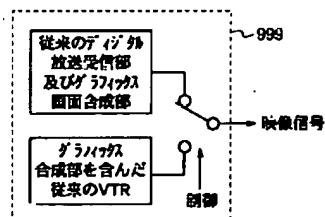
上記ラインAの同期パルス付近の拡大図および重畳される情報のビット列



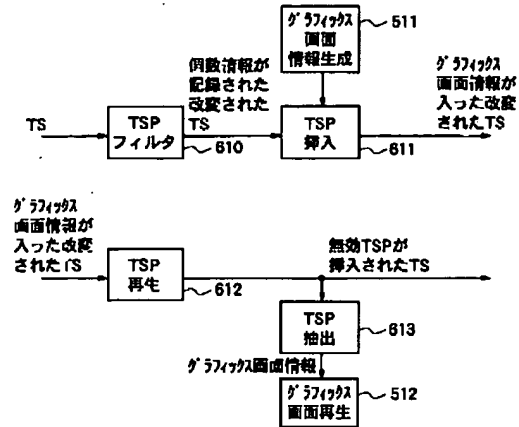
【図25】



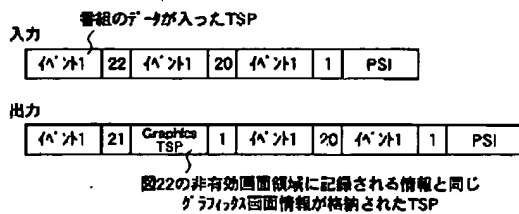
【図31】



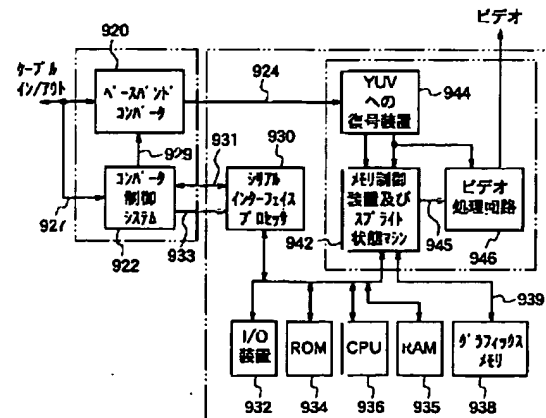
【図24】



【図26】



【図30】



フロントページの続き

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BA11 CA05 DA04 DA08 EA13
EA16
5C025 BA01 BA05 BA21 BA27 BA28
CA06 CA09 DA01 DA04
5C066 AA03 BA02 BA03 CA01 ED01
ED09 EE11 GA02 GA05 GA12
HA02 KE07 KE11 KE16 KF01
5C082 AA02 BA12 BA41 CA56 CA63
DA51 MM05